The Chinese Fleet.

Ships' names.	Displacement.	Armour (in inches).		Guns.	Torpedo discharges.	Speed, knots.
		On belt.	On turret, barbette, or battery.			
	Tons.					
Ting-Yuen ..	7,430	14	12	Four 30·5-cm., two 15-cm., eight machine	2	14·5
Chen-Yuen..	7,430	14	12	Four 30·5-cm., two 15-cm., eight machine	2	14·5
Lai-Yuen ...	2,850	9¼	8	Two 8¼-in., two 6-in., seven machine	4	16·5
King-Yuen..	2,850	9¼	8	Two 8¼-in., two 6-in., seven machine	4	16·5
Ping-Yuen ..	2,850	8	5	One 10·2-in. Krupp, two 6-in., eight Q.F.	4	(?)16·5
Chih Yuen..	2,300	—	10	Three 8-in., two 6-in., seven Q.F., two 47-mm. Q.F., eight 27-mm. Q.F., six machine	4	18·0
Ching Yuen .	2,300	—	10	Three 8-in., two 6-in., seven Q.F., two 47-mm. Q.F., eight 27-mm. Q.F., six machine	4	18·0
Tsi-Yuen ...	2,355	—	—	Two 21-cm., one 15-cm., nine machine	4	15·0
Chao Yung..	1,350	—	—	Two 10-in., four 4·7-in. Q.F., seven machine.	3	16·8
Yang Wei ..	1,350	—	—	Two 10-in., four 4·7-in. Q.F., seven machine.	3	16·0
Kwang Kai..	1,030	Hull partly of wood		Three 12-cm. Q.F., eight machine..	4	16·5
Kwang Ting.	1,030	Hull partly of wood		Three 12-cm. Q.F., eight machine..	4	16·5
Gunboat	440	—	—	One 11-in.	—	10·0
Gunboat	440	—	—	One 11-in.....	—	10·0
Six torpedo-boats	—	—	—	—	—	—

The Japanese Fleet.

Ships' names.	Displacement.	Armour (in inches). On belt.	Armour (in inches). On turret, barbette, or battery.	Guns.	Torpedo discharges.	Speed. knots.
	Tons.					
Matsusima ..	4,277	—	12	One 32-cm., 11 12-cm., five 6-pr. Q.F., 11 3-pr. Q.F., six machine	4	17·5
Itsukusima..	4,277	—	12	One 32-cm., 11 12-cm., five 6-pr. Q.F., 11 3-pr. Q.F., six machine	4	17·5
Hasidate....	4,277	—	12	One 32-cm., 11 12-cm. Q.F., six 3-pr. Q.F., six machine	4	17·5
Chiyoda	2,450	4½	—	Ten 12-cm. Q.F., 14 4·7 Q.F., three machine	3	19·0
Fuso	3,718	7	9	Four 24-cm., two 17-cm., five machine	—	13·2
Hiyei.....	2,200	4½	Hull composite	Three 17-cm., six 15-cm.	—	13·0
Takachiho...	3,650	—	—	Two 26-cm., six 15-cm., two (?) Q.F., 10 machine	4	18·7
Yoshino	4,150	—	—	Four 6-in. Q.F., eight 4·7-in. Q.F., 22 3-pr. Q.F.	5	23·0
Naniwa.....	3,650	—	—	Two 26-cm., six 15-cm., two (?) Q.F., 10 machine	4	18·7
Akitsushima.	3,150	—	—	One 32-cm., 12-c.m. Q.F., six machine	4	19·0
Akagi	615	—	—	One 24-cm., one 12-c.m., two machine	—	12·0
Saikio Maru.	—	—	—	"Fitted with guns as a cruiser."	—	—
Four torpedo-boats	—	—	—	—	—	—

Lord Brassey's lists do not contain the number in the crew of a ship, so that I am not able to give them; but there is reason to think that the Japanese were—though, perhaps, not largely—superior in number of officers and men to the Chinese. The "Ping-Yuen," "Kwang Ting," and the two gunboats might, perhaps, be excluded from the list of Chinese vessels, as, owing to their having been "detached to guard the entrance of the harbour," they took little part, and apparently no effective part, in the action. The gunboats are of a class not designed for employment in fleet actions; and it is difficult to imagine for them any other occupation in that off the Yalu than hampering the movements of their more mobile consorts, if they ranged themselves in formation with them. The only recorded instance of the gunboats' participation in the fight is that of firing the last shot in the action "when the enemy were out of range." The two Chinese gunboats and the Japanese "steam packet 'Saikio Maru,' which had been fitted up with guns as a cruiser," will therefore be omitted from the comparison of the respective forces which I am about to make.

The Chinese Fleet carried 98 guns, including quick-firers of the smaller natures. The Japanese Fleet carried 178. The number of machine-guns carried by the Chinese was 81; by the Japanese 54. As far as number of shot goes, the Japanese

could direct against their enemy a fire greatly superior to his. This superiority was even greater than would appear merely from the foregoing figures; because, whilst the Chinese had only 56 Q.F. guns of all natures, the Japanese had no less than 123. Even these latter figures do not express with sufficient precision the real superiority in amount of fire which the Japanese could bring to bear on their opponents. The Chinese had only 14 Q.F. guns of 4·7 in. calibre, the 12-cm. piece being considered as of that calibre, to which it approximates closely enough for the purposes of the present comparison. The Japanese had, as against the 14 of the Chinese, no less than 59 Q.F. guns of 4·7 in. or higher calibre. In view of the character of the action—which, as stated in your article of this morning, "was fought at comparatively long range," when the smaller quick-firers could rarely be used with effect—the superiority of the Japanese fire, at all events in the number of shot discharged and the consequent reasonably greater probability of hitting, appears to be overwhelming.

The Chinese had the superiority in one particular of their gun armament which is occasionally affirmed to be all-important, viz., in heavy guns. Of the 98 Chinese guns no less than 27 were "armour-piercing" of and above 8-in. calibre.

Of the 178 Japanese guns, only nine were of a higher calibre than 7 in. The Chinese had the superiority in another particular of their armament, which also is sometimes affirmed to be all-important. They had 42 torpedo-discharging arrangements against 32 Japanese.

In one element which we have become accustomed—during the last 25 years, that is—to hear extolled, viz., greater size of individual ships—the Chinese were superior. The united tonnage of the "Ting-Yuen" and the "Chen-Yuen"—14,860—exceeded by more than 2,000 tons the united tonnage—12,831—of the three largest Japanese ships—the "Matsusima," "Itsukusima," and "Hasidate."

The Japanese had the advantage of their opponents in speed, but to a less extent—all things considered—than might be expected. The number of knots shown against each ship in the lists is, of course, only a "best possible," and is equally delusive for both sides; but it can be used for purposes of comparison. Omitting the gunboats for the reasons already given, it is seen that the lowest speed with which any Chinese ship is credited is 14·5 knots; whereas three Japanese are of less than 13·5. In a general action the relative slowness of even a few individuals must lower the general rate of speed of the fleet; and it may be taken for granted that the speed of the Japanese never came anywhere near that attributed to the "Yoshino," or even that attributed to the "Takachiho" and the "Naniwa." Notwithstanding all this, the Japanese had so much the greater speed that they were able to "play round" their opponents to some extent. It ought to be added that it is probable that the Japanese ships, or many of them, had been longer out of dock than the Chinese. What this would imply will be readily understood by any one who is acquainted with Chinese and Japanese waters, and has observed the great rapidity with which ships' bottoms get foul, and the diminution of speed caused thereby.

From this survey of the characteristics of the two fleets, it may be perceived that each fairly represented a different principle. The principle represented by the Chinese was that advocated by the school which puts matériel above personnel, for their fleet contained the biggest ships, the less numerous but heaviest guns, and the most extensive torpedo armament. The principle of which the Japanese may be taken as the representatives is that of the school which appeals to history and experience, and not to theories evolved out of the inner consciousness of people without practical knowledge of the sea, and which maintains that the human factor is both the most important and the unchanging factor in war, which must in its broader features remain much what it has always been.

The lucid comments on your Chefoo correspondent's telegram contained in "The Times" of this morning, render it unnecessary to describe the various movements during the battle with the same minuteness as that with which the composition of the contending forces has been discussed. The engagement took the following form:—Admiral Ting, with 10 ships in some formation not exactly known, but not single line ahead, started at a seven knots speed to meet the approaching Japanese fleet, which, sooner or later, getting into single line ahead, passed round

the starboard, or right flank, and astern of the Chinese fleet, and, coming up on its other flank, steered in the same direction as that in which it was proceeding, and continued to exchange with it an animated gun-fire, scarcely ever at close, and generally at very long, range. The Chinese fleet in the course of the fight got broken up into two parts. One consisted of the two large barbette ships, which were engaged by seven of the principal Japanese ships. The latter moved round an outer circle, usually at long distance from a smaller and inner circle, around which the Chinese barbette ships moved. At the same time a kind of independent action was going on between the five inferior Japanese ships and four Chinese cruisers. The Chinese made one attempt to ram, and discharged one torpedo from a ship, and three from a boat. The attempt to ram resulted, it is claimed, in damaging, though not in destroying, the opponent attacked. The rammer herself was afterwards sunk, it was believed, by gun-fire. All the torpedoes discharged were ineffective. The Japanese tried to use neither the ram nor the torpedo. Besides the "Chih Yuen," the "Lai-Yuen" and "Chao Yung" were sunk by shot, and the "Yang Wei" was run aground, to avoid foundering in deep water. The Japanese flagship "Matsusima," which had taken her station in the centre of her line, was so severely injured that Admiral Ito had to shift his flag to the "Hasidate." The "Hiyei" was forced out of action for a time, and the armed packet steamer "Saikio Maru" had to go out of action altogether. The mast of the "Akagi" was shot away, and by its fall killed the captain and two men, all of whom were in the top.

The action lasted about four hours and a half, according to the Chinese, and fully an hour and a half more according to the Japanese. The battle of St. Vincent, it may be remarked, lasted from 11 h. 31 min. A.M. till 3 h. 52 min. P.M.; or, if we include the "few comparatively harmless broadsides" exchanged by the "Britannia" and "Orion" with the Spanish lee division, till 4 h. 50 min. P.M.—that is to say, less than five hours and a-half. The "First of June" began at 9 h. 24 min. A.M., the general firing ceased at 1 h. 15 min. P.M., and the action was over at 2 h. 30 min. P.M., having thus lasted just over five hours. The battle of Trafalgar was practically decided between noon and 2 P.M.; but the last of the captured ships struck just five hours after it began. These instances have been taken quite at random. The similarity of duration of these battles, differing so much in character, is not without interest. The Japanese left the scene of action, but returned the next day and fired a torpedo into the stranded "Yang Wei." The victory was certainly theirs, though their disappearance from the scene and the unmolested withdrawal of the Chinese transports explain, if they do not justify, the Chinese assertion, that it was they who had won the day, notwithstanding their losses.

The action was fought out entirely with guns. "The quick-firing guns gave the latter (the Japanese)," says the Chinese report, "an immense advantage, scattering showers of splinters, frequently setting the Chinese ships on fire, and riddling everything that was not protected." As an illustration of the greater chance of hitting that falls to the lighter guns, we have a statement of the number of shots fired from the heavy and from the 6-in. guns of the Chinese barbette ships. The eight 12-in. guns fired 197 rounds, or less than 25 apiece; the four 6-in. guns fired 268 rounds, or 67 apiece. The greater rapidity and accuracy of the Japanese fire—as was expected by those to whom the dominating effect of more rapid firing and more frequent hitting was known from historical record—afforded them more efficient protection than thick armour. The 12-in. armour of the Chinese barbette ships was intact; but their slightly protected 6-in. guns were also uninjured. From this it is difficult to see of what use the extra thickness of armour was. It would seem that it was never hit by an "armour-piercing shot;" and it supplies a useful practical illustration of the value of Sir George Clarke's suggestion ("Fortification," &c., p. 239), that the superficial extent of thick armour is so reduced in many so-called "armour-clads" that the protection given by it is due not so much to its impenetrability as to its small extent, which renders it unlikely to be hit.

The Chinese made a deliberate attempt to keep their bows turned towards the Japanese, in all probability in order to avail themselves of the highly-developed bow fire of their two barbette ships. The result of this action ought to be a warning to the confident people who advocate a heavy bow fire, to remember that all

statistics of it should be accompanied by an estimate of the loss in broadside fire which must result from developing bow fire beyond certain limits.

Of top fire we have no reports. It would be interesting to know if its effect was neutralized by the long range at which, as a rule, the action was fought.

The total Japanese loss is officially reported as 77 killed and 160 wounded. Out of a crew in each case probably less than a fourth of the number of Japanese engaged, the "Bellerophon" had 49 killed and 148 wounded, and the "Majestic" 50 killed and 143 wounded, at the Nile. At Trafalgar, out of a nearly similar crew, the "Colossus" had 40 killed and 160 wounded. Loss of life, at least on the part of victors, as also was shown at Lissa, therefore appears not likely to be as severe in modern sea-fights as in those of former days. The "Matsusima," it is true, is reported to have lost two officers and 120 men killed and wounded. The proportions as given must make us doubt the accuracy of the figures; but it may be admitted that her loss was heavy, though less so than that of the British frigate "Java" in her action with the "Constitution."

Superior rapidity and accuracy of fire bore the fruit which they have always borne in war, at any rate since the day when they brought about the defeat of the Invincible Armada. This superiority, as has always been the case, would have been barren of result had not the Japanese been sufficiently practised in manœuvring at sea to enable them to avail themselves of its effect. As in all really decisive general actions, as far back as history can tell us about them, the battle was not won by fighting single ship against single ship, but by concentrating a larger number of ships—as has been previously shown—against a smaller.

Your obedient servant,

September 29. A NAVAL OFFICER.

Argentine Republic.—The new torpedo-cruiser "Patria," built and engined by Laird Brothers, of Birkenhead, has been put through her official speed trials with eminently successful results, the procedure of the trials being similar to that laid down by the British Admiralty, armament and all normal weights on board. The official natural draught trial was made off Liverpool on August 24th, during boisterous weather and with a heavy cross sea, when, during eight hours' continuous steaming, 17·6 knots was attained with 201 revolutions. During six consecutive runs over the base between the outer lightships 17·91 knots was recorded, which was one-quarter knot in excess over contract. A further trial under natural draught was made on the 31st August over the measured mile on the Clyde, when four runs were made at 190 revolutions (which it was estimated would give 17·5 knots, the contract speed), with the result that 17·72 knots was recorded, with 11 revolutions per minute less than when running the trial in Liverpool Bay. The full power forced draught trial of three hours' duration was run the same day, when a mean speed of 20·57 knots with 233·5 revolutions per minute was attained, exceeding by 1 knot the guaranteed speed of 19·5 knots. There was an almost entire absence of vibration of the machinery and in the ship. The "Patria" is a cruiser similar to the "Halcyon" and "Harrier" class in the English Navy, but, on the recommendation of Messrs. Laird, the Argentine Government decided to have the poop and forecastle joined, forming a complete spar deck, which adds much to the general comfort and seaworthiness, makes it possible to place the broadside guns fully 7 ft. higher above water, and affords accommodation available for the carrying of troops when required, whilst the larger engine power gives a knot per hour greater speed. The "Patria's" principal dimensions are:—Length, 250 ft.; beam, 31 ft. 6 in; draught of water, with armament and all normal weights on board, 10 ft. (the screws do not project below the line of keel), with a displacement of 1,070 tons. Bunker capacity for 250 tons of coal, or 4,000 knots range of action. The machinery, condensers, &c., and general arrangements are similar to the builders' well-known type of high-speed engines of which those of the "Rattlesnake" were the original. There are four boilers of the dry bottom locomotive type, worked on the closed-stokehold system, the air pressure for full power not exceeding 2½ in., each set of engines and boilers being in a separate compartment.

The armament consists of two 4·7-in. Armstrong Q.F. guns; four 8-pr. and two

3-pr. Maxim-Nordenfelt Q.F. guns carried on the spar deck, and two 1-in. machine-guns on the bridge, whilst there are five torpedo-discharges, one bow tube and four broadside tubes, carried on the main deck, worked through specially designed ports, the torpedoes being the latest 18-in. pattern made by Whitehead of Fiume.

Austria-Hungary.—We are enabled now to give details (Plate 52) of the last armour-plate trials at Witkowitz. In accordance with the contract specifications of the War Ministry (Marine Section) agreed on with the Witkowitz firm for the delivery of armour plates, a plate is selected for trial from each 300 tons of armour before its final acceptance. The plate selected from the first delivery was a homogeneous nickel-steel plate, 6 ft. by 6 ft., and 10·8 in. thick, and was tested by the Naval Commission on the 12th June last, at the proof butts at Witkowitz, with the following results (p. 1151).

The Commission reported that the trial plate had fulfilled the conditions of the contract in every respect.

A comparison with the standard plate tested in November last shows that the acceptance plate gave on the whole better results than the former, as it was in no case completely penetrated, and not even a surface flaw was visible in it. Further, the acceptance plate was pierced by the 15-cm. steel shell to the extent of only 128 mm. on the average, as against 220 mm. in the standard plate. ("Mittheilungen aus dem Gebiete des Seewesens," and other sources.)

In view of the fact that even Austria can now hold her own in the manufacture of armour-plates against English firms, it may be interesting to note that, according to a statement made the other day before the Hungarian Delegation, by Admiral Baron von Sterneck, the Minister of Marine, with the one exception of coal, the Austrian Navy is quite independent of foreign countries. "It has always been the endeavour of the Admiralty," said the Minister, "to draw our supplies from native industry. We obtain all our shipbuilding material at home, although the price is higher than it is, for instance, in England. Through the support and mutual efforts of foundries, we have ourselves succeeded in making, not only the heavy projectiles for armoured ships, but also all the armour-plates we require. Ropes and sails, which we were formerly obliged to obtain from abroad, are now procured exclusively from native manufacturers, a great part of the supply coming from Hungary."

The Government has decided to build six new 1st class torpedo-boats, for the construction of which a sum of 108,000*l.* has been assigned.

The manœuvre squadron, which has now been broken up at the conclusion of the season, was this year composed of the following vessels:—

First Division—Rear-Admiral J. Hinke. Battle-ships "Kronprinz Erzherzog Rudolf" (flagship), "Kronprinzessin Erzherzogin Stephanie," and "Tegethoff."

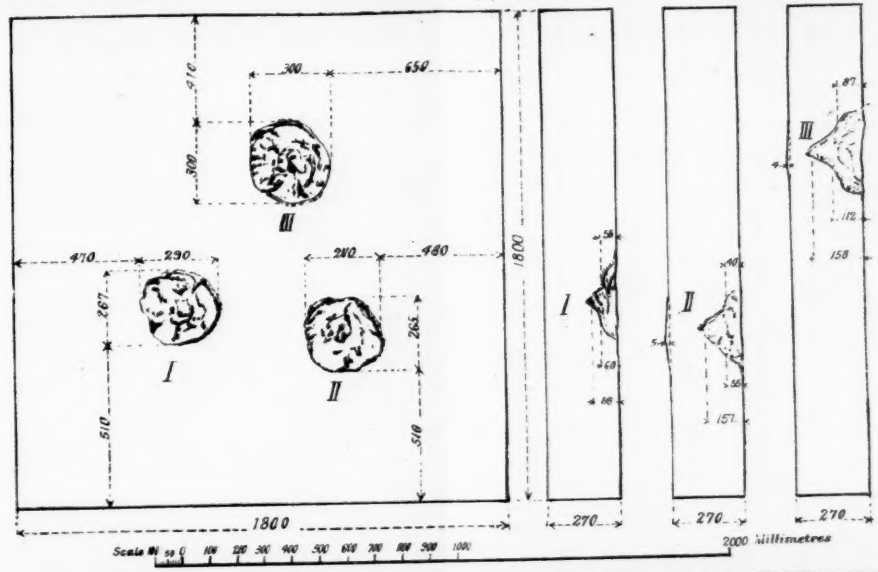
Second Division—Rear-Admiral H. I. H. Archduke Karl Stephan. "Prinz Eugen" (flagship), "Kaiser Max," and "Don Juan d'Austria."

Cruiser Division under command of Captain Thewalt—

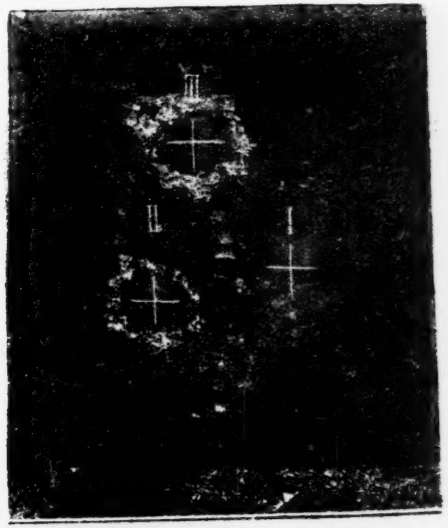
1st class protected ram-cruiser "Kaiser Franz Josef" (flagship).
Torpedo-cruisers "Tiger," "Lussin" and "Sebenico."
Torpedo-avisos "Satellit," "Planet," "Trabant."
Depôt torpedo-ship "Pelican."
Squadron store-ship "Pola."
Workshop depôt ship "Gigant," and 14 first-class torpedo-boats.

Denmark.—The 3rd class protected cruiser "Heimdal" was launched at Copenhagen on 31st August, in presence of the King and Queen, many members of the Royal Family, the Queen of Greece, and other high personages. The "Heimdal"

TRIAL ON THE 12th JUNE, 1894, OF A 10.8 INCH NICKEL STEEL PLATE AT WITKOWITZ, AUSTRIA.



FRONT VIEW.



REAR VIEW.

HARRISON & SONS, LITH., ST. MARTIN'S LANE, W.C.

Date.	Wilkowitz, 13th of June, 1894.				
Temperature of air.	15° Centigrade.				
Fixing of plate.	270 mm. homogeneous nickel-steel plate with six bolts. 50 mm. bolts on a wooden backing of 50 cm.				
Gun used.	15-cm. 35-calibre long gun, Mark 1886, on broadside mounting.				
No. of the shot.	1	2	3		
Kind of projectile.	Streitzeben steel shell, 3·5 calibres long.				
Weight.	51 kilogrammes.				
Powder charge. Quality of	Prismatic powder, Mark 1886, delivered 1892.				
Powder charge. Weight of	16·5 kilogrammes.				
Striking velocity.	603·5 metres.				
Gas pressure.	2,420	2,296	2,426		
Observations with regard to projectile.	Shell in pieces, point like mushroom, sticking. When the point fell out after the third shot, the indentation proved to be 80 mm.	Shell in pieces, point in a mushroom form, sticking. When falling out after Shot 3, the indentation proved to be 137 mm.	Shell in fragments, a small part of the point sticking. Measurable indentation, 158 mm.		
Observations with regard to plate.	No cracks whatever to be seen. On the front side a funnel-like indentation of 275—280 mm. diam. and 88 mm. (maximum) depth. On the back side nothing to be seen.	No cracks whatever, funnel-like indentation of 265—275 mm. diameter and 37 mm. maximum depth. On the back side a bulge of 5 mm. height.	No cracks whatever, funnel-like indentation of 300 mm. diameter, and, as far as measurable, of 158 mm. depth. On the back side, bulge of 9 mm. height.		
Note.	Distance of plate from muzzle, 60·5 metres; recoil of gun, 540 mm.	Ditto.	Ditto. At this shot the points of the two first shells fell out.		

is a sister of the "Geiser," launched in 1892. Another vessel, the "Hekla," of the same tonnage, but 24 ft. shorter, and with 5 ft. more beam, was launched in 1890. The "Heimdal's" dimensions are as follows:—Length, 257 ft. 6 in., beam, 27 ft. 6 in., and with a mean draught of 11 ft. 4 in., a displacement of 1,280 tons. Her engines are to develop 3,000 I.H.P., and to give a speed of 17·5 knots. The ship is built of steel, with a double bottom, and an armour deck 1·5 in. thick. The armament will consist of two 6-in. Krupp guns, four 3-pr. Q.F. guns, six machine-guns, and four torpedo-tubes.

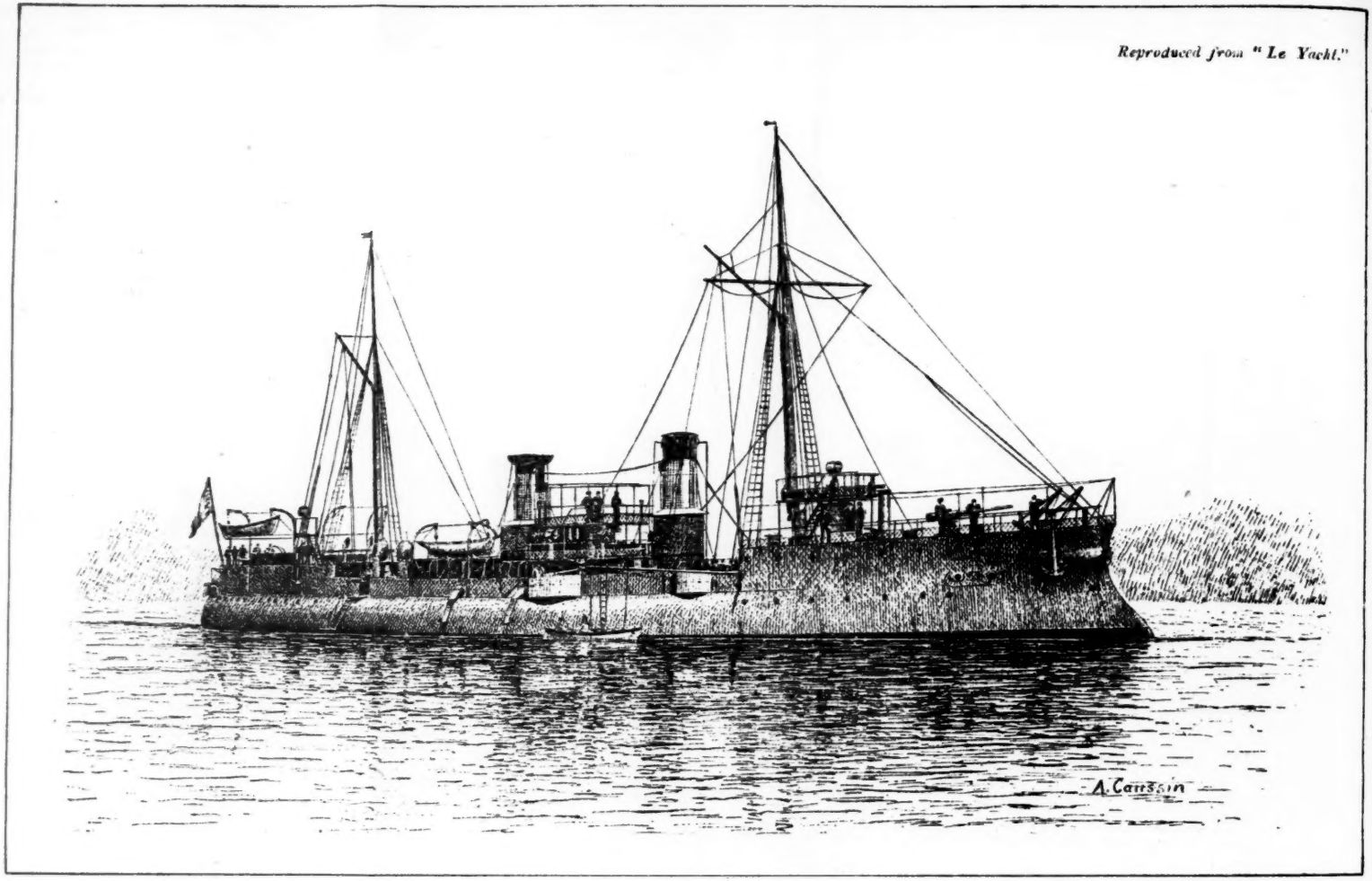
The arming of the new sea fort of Middelgrund at Copenhagen (of which we gave some details in the August Notes) is now nearly completed. It stands on the Middle Ground Shoal, about 3 miles from the mouth of the harbour, and is in telegraphic and telephonic communication with the other forts and the capital. The armament consists of 30 guns, of which five are 30·5-cm. (12-in.) Krupp guns, which throw a projectile of 725 lbs., and have a range of about 7 miles. Each of these guns has an arc of training of 265° seawards. There are further 12 17-cm. (6·8-in.) guns, and the remainder are Q.F. guns of a somewhat smaller calibre. The garrison will be composed of 700 men, of whom 500 will be artillery, 140 infantry, and 60 men of the naval mining corps, who will man a division of torpedo-boats, which will be stationed in the small port which has been formed adjacent to the fort. In peace-time the garrison will be accommodated in well-ventilated quarters, lit by electricity, and in war-time in shot-proof casemates. The magazines are 60 ft. below the gun platforms, and the ammunition and projectiles will be transported to the different batteries by means of lifts and small railways. The fort is provided with numerous steam and dynamo engines, as well as with a powerful accumulator battery, which will supply the 500 electric lamps in the fort for several days. ("Die Reichswehr.")

Experiments with a new form of torpedo-net cutter are being carried out at the submarine-mine station at Bramonäs by order of the Danish Minister of Marine. The "torpedo scissors," as the appliance is called, are the invention of a Danish naval officer. They are fixed at the head of the torpedo, and their action depends upon its speed. Having effected a breach in the net, the scissors fall aside and allow the torpedo to pass on and strike a ship's side. The experiments are stated to be so far successful, and the invention is regarded as hopeful.

France.—The following are the principal promotions and appointments which have been made:—To Rear-Admiral, Capitaine de Vaisseau C. H. Fournier; to Capitaine de Vaisseau, Capitaine de Frégate Charpentier. Vice-Admirals—Humann to Ministry of Marine as Chief of the Staff of the Navy, Vignes as Inspector-General of the Navy, De la Jaille to command of the Active Division of the Mediterranean Fleet, Alquier to command of the Squadron of the North, Gervais to command of the Squadron of the Reserve in the Mediterranean, Brown de Colstoun as Maritime Prefect of the 5th Arrondissement (Toulon). Rear-Admirals—Montesquiou-Fézensac as Chief of the Staff of the 1st Arrondissement Maritime (Cherbourg), Maréchal as Head of the Hydrographical Department, Mac-Guckin de Slane to command of the 2nd Division of the Active Squadron of the Mediterranean. Capitaines de Vaisseau—Pradier to "Formidable," Puech to "Richelieu," d'Hombres to superintend the fitting out of "Valmy," Boutet to command of submarine defences at Toulon, de Sales de Banières to "Caïman," Rouvier to "Magenta," Le Borgne de Kerambosquer to "Hoche." Capitaines de Frégate—Goëtz to "Coëtlogon," Noirot to "Dumont-Durville," Campion to "Dupetit Thouars," Salaun-Penquer to "Romanche," Gervaise as Chief of the Staff to Rear-Admiral Mac-Guckin de Slane, and Lacournée to "Européen."

("Le Moniteur de la Flotte.")

We regret to have to record the death of Rear-Admiral Le Bourgeois, commanding the 2nd Division of the Active Squadron of the Mediterranean Fleet, which



THE NEW FRENCH TORPEDO—AVISO "D'IBERVILLE." 925 TONS. 5,000 I.H.P.

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took place at Toulon on the 15th September. His loss is much felt, as he was considered to be one of the most competent Flag Officers in the Navy. The deceased officer is the second Rear-Admiral in the Mediterranean Fleet who has died with his flag flying during the last 18 months, Rear-Admiral Buge having died on board his flagship the "Dévastation" on the 17th February of last year.
("Le Temps.")

The new torpedo-aviso "D'Iberville" (Plate 53), having completed all her trials at Rochefort, has left to join the Active Squadron of the Mediterranean Fleet, where she will take the place of the "Lévrier," a vessel of the same class, but of an older type, which will be placed in Reserve at Toulon. The dimensions of the "D'Iberville" are as follows:—Length between perpendiculars, 262 ft. 6 in.; beam, 26 ft. 6 in.; and a mean draught of 10 ft. She has a displacement of 925 tons, twin-screw triple-expansion engines of 5,000 I.H.P., and four Lagrafel and d'Allest boilers. The ship was built at St. Nazaire at the works of the Société des Ateliers et Chantiers de la Loire, was laid down on the 26th August, 1891, launched on the 11th September, 1893, and finally completed her trials in August of this year. On a six hours' run, with the engines developing 1,800 I.H.P. and making 207 revolutions a minute, the mean speed was 15·8 knots, with a consumption of coal of about 1·5 lbs. per each H.P. developed; on an 18 hours' run, with 3,313 I.H.P. and 258 revolutions of the engines, a mean speed of 19·3 was obtained, the consumption of coal being about 2 lbs. per each H.P.; on the four hours' run under forced draught, 5,000 I.H.P. was developed, and with 292 revolutions a speed of 21·6 knots was maintained, the consumption of coal being about 2¼ lbs. per each H.P. The armament of the "D'Iberville" consists of one 4-in. Q.F., three 6-pr. Q.F., and four 1·5-in. Q.F. guns, with six torpedo-tubes. The fuel employed was the Anzin briquette, which is made in France from Welsh coal, and has given such excellent results that it is the fuel invariably used now in the torpedo-avisos and torpedo-boats. ("Le Yacht.")

The new 2nd class cruiser "Chasseloup-Laubat" has been commissioned at Cherbourg to undergo her trials. The 1st class battle-ship "Brennus" at Brest is still continuing her trials with apparently satisfactory results; during a six hours' run, with the engines developing 5,700 I.H.P. and making 71 revolutions, a speed of 14·4 knots was obtained. Some successful trials have been carried out on board the 3rd class cruiser "Surcouf" with under-water torpedo-tubes on the system Drezmechi; the results are reported to have been so satisfactory that it is likely all the new cruisers will be fitted with them. ("Le Moniteur de la Flotte.")

The Reserve Squadron of the Mediterranean Fleet has been placed "en disponibilité armée" from the 1st of October; the torpedo-cruiser "Wattignies" has been transferred from the Active to the Reserve Squadron of the Fleet, her place being taken by the torpedo-cruiser "Condor" from the Reserve Squadron. The 1st Division of the Squadron of the North, consisting of the battle-ship "Suffren," flagship, the coast-defence ship "Requin," the 1st class cruiser "Jean-Bart," the 3rd class cruiser "Surcouf," the torpedo-cruiser "Épervier," the torpedo-aviso "Lance," and the torpilleurs-de-haute-mer "Averne" and "Dauphin," have also been placed "en disponibilité armée" at Brest, which remains their head-quarters; the coast-defence battle-ships "Fulminant" and "Tonnerre," lately forming part of the Squadron, have been paid off and transferred to the 2nd class Reserve at Brest. The 2nd Division of the Squadron of the North, under the command of Rear-Admiral Ménard, will as usual remain with their effective complements complete, and will consist of the cuirassé de croisière "Turenne," the coast-defence battle-ship "Furieux," the 3rd class cruiser "Coëtlogon," the torpedo-aviso "Salve," and the torpilleurs-de-haute-mer "Lancier" and "Archer." This division will, as has been already reported, be shortly reinforced on the completion of their trials by the new coast-defence battle-ship "Jemmapes," the new armoured cruiser "Latouche-Tréville," and the new torpedo cruiser "Fleurus."

The 1st class battle-ship "Courbet" was commissioned on the 1st of October to relieve the "Amiral Duperré" in the Active Squadron of the Mediterranean Fleet, the latter ship passing into the Reserve Squadron. ("Le Moniteur de la Flotte.")

The authorities at Brest have received instructions to prepare plans for a small cruiser of exceptional speed and radius of action. She is to steam 23 knots under forced draught, and 20 knots for 24 consecutive hours. The armament is to consist of ten 3·9-in. 28-pr. Q.F. guns and twelve 1·85-in. 3-pr. Q.F. guns. There will be pole masts without military tops. In order to keep the vessel at the same draught of water, arrangements are to be made whereby in proportion as her coal and stores are exhausted water will be admitted to certain compartments. ("Le Temps.")

The following vessels have been commissioned to reinforce the squadron under the command of Captain Bienaimé, in view of operations against Madagascar:—3rd class barbette-cruiser "Dupetit Thouars," aviso-transport "Romanche," and the gunboats "Gabés" and "Météore." The 1st class cruiser "Isly," lately attached to the 2nd Division of the Squadron of the North, has been ordered to proceed to China to reinforce the squadron in those waters. ("Le Temps.")

We mentioned in last month's Notes that the operations in the Channel were brought to a close by some attacks by the torpedo-boats of the Défense Mobile against the Squadron of the North, while at anchor in Morgat Bay, on the night of the 28th August, and on the next night when the squadron was *en route* for Cherbourg. The following details of the attacks are taken from the "Yacht." The leading idea was as follows:—A hostile squadron (represented by the Northern Squadron in full strength), with command of the sea, is supposed to have attacked Brest harbour without success, and, having suffered a certain amount of damage to some of the ships, it retires to the Bay of Douarnenez in order to effect the most urgent repairs whilst at anchor. The Brest torpedo-boats, under shelter of night, attack the squadron at anchor. The 10 larger ships were anchored in an octagonal formation some 1,500 yards from the shore, while the avisos "Salve" and "Lance," with the four torpilleurs-de-haute-mer and the steam-launches of the squadron, were employed to watch the approaches to the bay, using their search lights to form a cordon of light over the entrance. The night was dark and rainy, but calm. The attacking force consisted of 13 boats of the "Défense Mobile" of Brest, and, in spite of all the precautions of the defenders, several of the boats seem to have succeeded in creeping into the bay without being observed, one of the first torpedoing the "Requin," and not being detected until she burnt her red light and blew her whistle (the sign of a successfully launched torpedo). The next day there was a fresh breeze and a roughish sea; the squadron weighed at 4 P.M., and proceeded at the speed of 7 knots, the maximum speed which the injured battle-ships were supposed to be able to maintain. The six battle-ships were formed in single column in line ahead, with the cruisers, avisos, and torpilleurs-de-haute-mer disposed ahead, astern, and on each flank, as look-out vessels. In consequence of the high sea which was running, it was not expected that the torpedo-boats, which had retreated to Camaret Bay after the attack the previous night, would venture out; but about 10.30 the "Jean-Bart" opened fire. It was, however, too late, as the torpedo-boats were among the squadron, whose officers were forced to admit that most of the individual attacks would have been successful in real action; there seems to be no question as to the skill and daring with which the boats were handled in very unfavourable weather and close to a dangerous coast, and no accident of any kind occurred among the 13 boats which formed the attacking force. M. Weyl attributes this success to the constant exercise at sea, to which the boats of the Défense Mobile at Brest are subjected in all weathers, and to the skill in handling their little vessels and intimate knowledge of the coast, where they have to act, thus acquired by their Commanders.

The Netherlands.—Want of space prevented us last month noticing the launch of the new battle-ship "Piet Hein," which took place on the 16th of August. She is one of three ships of a similar type at present under construction, their dimensions being as follows:—Length, 283 ft.; beam, 47 ft.; and with a mean draught of 16 ft. 9 in., they have a displacement of 3,400 tons. The engines are to develop 4,800 I.H.P., giving a speed of 16 knots. There is a complete water-line belt 6 in. thick; the turrets have 9·5-in. armour, and there is a 2·5-in. armoured deck. The armament will consist of three 21-cm. (8·2-in.) guns, two of which are mounted in the barbette turret forward, and the third aft, two 6-in. Q.F., mounted one on each beam, six 6-pr. Q.F., and six 1·8-in. Q.F. guns, with two torpedo-tubes.

On the 12th September the Queen Regent, accompanied by the young Queen of the Netherlands, reviewed in the Texel, off Nieuwediep, the largest squadron that for many years has been assembled in commission in Dutch waters. The vessels in line were the armoured ram "Koningin Wilhelmina der Nederlanden," 4,600 tons, launched in 1892, and only lately completed. She has engines developing 6,000 I.H.P., and a speed of 17 knots; three coast-defence armoured rams, the "Guinea," "Stier," and "Rainier-Claezen," of 2,485, 2,040, and 2,500 tons respectively; the two first vessels have a belt of 6-in. armour, and 8-in. armour on the turret forward, in which is mounted one 28-cm. (11·02-in.) Krupp gun, but they only have a speed of 12 knots; while the last-named, launched in 1891, has 10-in. armour on her turret, and carries, in addition to her heavy gun, one 6-in. Q.F., and six smaller Q.F. guns; the coast-defence monitors "Matador," "Luipard," "Heiligerlee," and "Cerberus," the first-named of 1,935, and the other three of 1,525 tons respectively; these vessels, although small and of low speed, are heavily armed, the first carrying two 28-cm. (11·02-in.) guns in her turret forward, and the others one gun of the same calibre, besides a complement of Q.F. guns; the 1st class cruisers "Atjeh" and "De Ruyter," of 3,400 tons; the 4th class cruiser "Sommelsdijk," of 1,005 tons; the gun-vessels "Braga," "Heimdall," and "Hefring," the gunboats "Geep" and "Lynx," and the training-ships "Nautilus," "Argus," and "Bellona," with 10 torpedo-boats. The weather was magnificent, and the unwonted spectacle attracted a large number of yachts and pleasure steamers.

Russia.—Rear-Admiral Skrydloff has been appointed Captain of the Port of Cronstadt in succession to the late Rear-Admiral Razvozoff; it is further reported that Vice-Admiral Tyrtoff has been selected to succeed Rear-Admiral Avelan in command of the Mediterranean Squadron. ("St. Petersburg Novosti.")

The 18th Naval Division lately quartered in St. Petersburg has been transferred to Cronstadt, its place in the Capital being taken by the 1st Division. The ships of the Training Squadron completed their cruising period for the year in the middle of September, with the exception of the "Skobeleff," on board of which the Marines of the Guard are embarked for their summer training, which was to remain in commission another month. ("Kronstadt Messenger.")

On the 28th August, in presence of the Tsar, the Tsarina, and other members of the Imperial Family, was launched the new coast-defence battle-ship "Admiral Senjavine;" she is a sister-ship to the "Admiral Ushakoff," which was launched towards the close of last year. Her dimensions are as follows:—Length, 278 ft.; beam, 52 ft.; mean draught, 17 ft., with a displacement of 4,126 tons; the engines are to develop 5,000 I.H.P., giving an estimated speed of 16 knots. Protection is afforded by a 10-in. steel belt, with a 3-in. armoured deck, and 8-in. armoured transverse bulkheads forward and aft. The armament will consist of four 23-cm. (9·2-in.) guns in two turrets protected by 8-in. armour, one forward and one aft, four 6-in. Canet Q.F. guns, six 3-pr. Q.F. and eight 1·8-in. Q.F. guns, with four torpedo-tubes. ("Kronstadt Messenger.")

Some important changes are to be made in the constitution of the Mediterranean and China squadrons. Last April we mentioned that the 1st class belted cruiser *"Admiral Nachimov" and the protected cruiser "Rynda" had been transferred* from the Mediterranean to China; they are now to be followed by the battle-ship "Imperator Nicolai I," and the belted cruiser "Pamjat Azova," while the 3rd *class cruiser "Djghite" and the torpedo-cruisers "Gaidamak" and "Posadnik"* have also left Cronstadt for Vladivostock.

The places in the Mediterranean of the above-mentioned ships will be taken by *the new 1st class battle-ship "Gangut" and the belted cruiser "Vladimir Mono*mach," with the two new armoured gunboats "Otvajny" and "Gremisstchi," while four torpilleurs-de-haute-mer, the "Sveaborg," "Revel," "Kotka," and "Borgo," have also been sent to that station. The small armoured gunboats are of a special type, and said to be good sea boats; their dimensions are as follows:—*Length, 227 ft.; beam, 42 ft. 3 in.; and with a mean draught of 10 ft. 6 in. they* have a displacement of 1,500; they have engines of 2,000 I.H.P., which ought to give a speed of 15 knots, but in the case of the "Otvajny," on her trial trip, it is *reported that a speed of only a little over 13 knots was obtained. They have an* armour belt 4·9 in. thick, and a 1·4-in. steel protective deck. The armament consists of one 9-in. forward, one 6-in. Q.F. gun aft, ten 47-mm. (3-pr.) and *37-mm. Q.F. guns, and two torpedo-tubes; all the guns are well protected by steel* shields. The 1st class gun-vessel "Teretz" will also probably be replaced by one of her five sisters from the Black Sea. The new torpilleur-de-haute-mer "Sestoretzk," *built by Messrs. Normand, of Havre, has arrived at Cronstadt*; she is a vessel 118 ft. long, 13 ft. 2 in. beam, of 75 tons displacement, and has engines developing 1,300 I.H.P., and giving a speed of 24 knots. ("Le Moniteur de la Flotte.")

Turkey.—Two new 3rd class cruisers were recently launched in the Golden Horn named the "Sedd-ül-Bahir" and "Zohaff," and they will replace two obsolete corvettes of the same name. They are of 800 tons displacement, and will be armed with four 5-in. Q.F. guns, six Hotchkiss 3-pr. Q.F. guns, and two *torpedo-tubes. Two new gun-vessels and two gun-boats were also launched at the* same time, named the "Seyd-i-Deriah," "Shefket Numa," "Rehber," and "Ahter." They are all of some 200 tons displacement, and will carry four small *Q.F. guns. A torpedo-destroyer of 270 tons, built at the Germania Yard at Kiel,* was launched last month, and an aviso of 850 tons, to attain a speed of 21 knots, is also being constructed at the same yard. ("Le Moniteur de la Flotte.")

United States.—The following statement has been made by the Bureau of Ordnance as a result of a publication regarding surface cracks in two of the 6-in. barbette plates of the battle-ship "Massachusetts:"—"The matter of surface cracks inherent in Harveyized armour has been thoroughly investigated by the Bureau; several plates in which such cracks existed have been tested ballistically, and in no case was it found that the cracks affected the resisting qualities of the armour. Notably, the 6-in. curved steel plate A-883 (intended for the 8-in. barbettes of the 'Massachusetts'), which was manufactured by the Carnegie Steel Company, and rejected because of numerous surface cracks, was tested by firing at it four shots from a 6-in. gun (two shots with a velocity of 1,800 f.s., and two with 2,000 f.s.), and the test showed that the cracks did not affect in the slighest degree the ballistic efficiency of the plate, notwithstanding the fact that this test was far more severe than that prescribed for the acceptance test of such a plate, namely, one shot with a velocity of 1,472 f.s., and one with 1,659 f.s. The plates referred to in the 'New York Herald' of August 22 are curved 6-in. plates intended for the 8-in. B. L. R. barbettes of the 'Massachusetts.' The surface cracks are of the same nature as those in the experimental plate A-883, and are due to shrinkage during the water tempering, and are not considered of any importance whatever." ("Army and Navy Journal.")

Some very successful tests of the pneumatic dynamite gun at Sandy Hook have been lately made. A 6-in. sub-calibre projectile from the pneumatic gun, charged

with 50 lbs. of explosive gelatine, is reported to have attained a range of nearly 6,000 yds., or over 3 miles, a 10-in. shell 3,500 yds., and a 15-in 2,500 yds. Tests were made with 8-in. sub-calibre projectiles, charged with 100 lbs. explosive gelatine, 10-in. charged with 200 lbs., and 15-in. with 500 lbs. The tests for accuracy are reported to have been satisfactory, and the fuzes worked properly. In the test for rapidity of fire, starting with the gun open at the loading angle and the first plug on the loading car, the first round was fired in 52 secs. The group of five shots, each weighing 445 lbs., was fired in 8 min. and 45 secs. The contract requirements for this performance are that the first shot shall be fired in 1 min. and 30 secs., and the group of five in 10 min. Ten rounds were fired in the second group. Each plug weighed 556 lbs., being of the same weight as the 10-in. sub-calibre projectile and its charge of 200 lbs. of explosive gelatine. Starting as before, the first round was fired in 39 secs., and the group of 10 rounds in 14 min. and 40 secs. The contract requirements for this group are—first round in 2 min., and the group in 27 min. Ten rounds were fired in the third group also. The plugs weighed 1,160 lbs. each, and each represented a 15-in. full calibre projectile, with its charge of 500 lbs. of nitro-gelatine. With the same conditions of starting as in the other two groups, the first round was fired in 46 secs., and the group of 10 shots in 15 min. and 36½ secs. The contract requirements for this group are—the first round in 3 min., and the group in 40 min. The firing time for all the 25 shots was 39 min. 30 secs.; contract time, 77 min. This shows that the firing was done in about half the time the Company had contracted for.

("Army and Navy Journal.")

Concerning the failure of a Harveyized armour plate, Mr. F. Cremer, of the American Metallurgical Works, Phœnixville, Pa., whose speciality is tungsten, its alloys and combinations, writes as follows:—"The nickel Harveyized steel is simply an alloy consisting of steel, nickel, and chromium, nickel being added to increase the toughness, chromium to increase the hardness of the material. Theoretically, no objections could be raised, but as chromium is exceedingly brittle, counteracting the effect of the nickel, and at the same time very hard to melt, a lack of uniformity in the plates is unavoidable. Parts of the plates will have a higher percentage of chromium than the one intended, and when struck by a projectile will cause a shattering of the plate into minute fragments. If we can add another metal capable of imparting to steel its hardness without annulling, an armour plate will have been found. Fortunately, there exists such a metal which metallurgists call tungsten or wolframium. The hardness which steel, and even the much less brittle wrought-iron, derives from it is little short of marvellous; any degree of hardness can be obtained without impairing the effect of the nickel. Tungsten is more fusible than chromium, and a more uniform casting can be obtained; but if it were not, slight irregularities would not involve such risks as are necessarily due to the use of chromium. In this case slight differences in hardness would be the only effect. Tungsten is used in every kind of steel where at the same time hardness and toughness are called for. The famous Damascene steel and our best tool steels, blades, razors, &c., all contain it in a greater or lesser amount, and its applicability to the manufacture of armour plates is obvious. There are strong reasons, too, for attributing the well-known excellence of Krupp's armour plates, whose composition is kept a secret, to the use of this metal. It is true, experiments with tungsten in this line have never been made in this country, but the national interest imperatively demands that they should be made. If, contrary to all expectations, they should fail, no harm would result, but if successful, an immense benefit would be derived therefrom for the nation."

("Scientific American.")

MILITARY.

In the June number for this year we published a short notice of Captain Carter's essay on "Mountain Warfare," based on the statements which had appeared in the "Pioneer," and which, to the best of our knowledge, remained uncontradicted. This notice has produced the following letter from the Council of the United Service Institution of India, which we give below in full without comment:—

"No. 987.
"*United Service Institution of India.*
"*Simla, 28th August,* 1894.

"The Secretary,
"Royal United Service Institution,
"London.

"Dear Sir,

"The attention of the Council of the United Service Institution of India has been drawn to an editorial note which appeared in the notices of books appended to the 'Journal of the Royal United Service Institution,' dated 15th June, 1894, in which it is stated that Captain Carter's essay on 'Mountain Warfare' was disqualified from receiving the gold medal of last year owing to the fact that the form and type of the journal was altered, and that Captain Carter was in ignorance of this fact when he competed for the medal. The Council now desire me to point out that the true facts of the case were as follows:—

"The conditions for the Prize Essay of 1893 appeared in the 'United Service of India Journal' for July, 1892, and the type and form of this journal should have been the model for the competitors.

"Captain Carter's essay was printed in a different type to that in use for the journal, but calculating its length according to the type ordinarily employed, it still considerably exceeded the prescribed length of 32 pages, and was, consequently, disqualified.

"No change, sufficient to affect the point at issue in Captain Carter's case, has been made in the type of the journal for many years.

"I trust you will be able to correct the statement alluded to.

"Yours faithfully,
"L. C. COLOMB, Captain,
"Secretary United Service Institution of India."

Home.—*Notes from the Report of the Small-arms Penetration Committee,* 1893–94 (reprinted by permission from the "R.E. Corps Journal").—The above Committee was presided over by Colonel T. Fraser, C.B., C.M.G., R.E., and the three rifles tested by it were the Lee-Metford 0·303-in. bore, with a bullet of 215 grains, sectional density 0·3346, specific gravity 10·484, and a muzzle velocity of 1,975 to 2,000 f.s.; the Mannlicher 0·256-in. bore, with a bullet of 160 grains, sectional density 0·3488, specific gravity 10·404, and a muzzle velocity of 2,300 to 2,400 f.s.; and the Martini-Henry 0·450-in. bore, with a bullet of 480 grains, sectional density 0·3386, specific gravity 10·916, and a muzzle velocity of 1,270 to 1,300 f.s. The cordite gave muzzle velocities sometimes differing by 100 f.s. The velocities of the Mannlicher fell off very much during the firing of 1,000 rounds, owing to the erosion of the barrel. The Lee-Metford was not affected after firing 3,000 rounds. The ammunition for the Mannlicher and Lee-Metford was about the same in bulk for 150 rounds, but those of the Mannlicher weighed 7·271 lbs., against 8·807 lbs. for the Lee-Metford.

The main advantage of the Mannlicher is the greater flatness of its trajectory, and consequently greater margin at the decisive ranges. Thus the 6-ft. margins at 1,000 yds. are, for the Mannlicher 168 ft., for the Lee-Metford 156 ft., and for the Martini-Henry 82 ft. So long as the very small bullet now in use is effective against troops, the importance of this length of margin outweighs all other con-

siderations. As regards accuracy of fire, when once the sighting was obtained the Mannlicher was very good, and was rather better at 1,000 yds. than the Lee-Metford.

Effect on Brick Walls.—The small-bore rifles easily penetrated a 9-in. brick wall with ½-in. boards at the joints, though the bricks resisted the bullets. At 100 yds. the joint of a 9-in. wall and seven ¾-in. deal boards were penetrated, and at 400 yds. some of the bullets penetrated the joints of the wall and two ¾-in. deal boards. At 600 yds. the bullets passed through the joints of a 4½-in. wall and seven ¾-in. boards beyond, and at 400 yds. bullets passed through the joints of a 14-in. wall and two ¾-in. boards.

At 200 yds. 200 rounds breached a 9-in. wall so that a man could get through—the hole in the wall measured 24 in. by 15 in. At the same range it took 1,028 rounds, mostly in volleys of 50, to make a smaller breach in a 14-in. wall.

A wall with ⅜-in. joints of hard mortar was found to be practically impervious to the new small-bore bullets. Hence, brick walls for defences should be 9 in. thick and have fine joints set in cement. It might be added that, for such a purpose, the bricks should break joint horizontally as well as vertically.

Two thicknesses of 2½ in. of bricks, breaking joint, placed between boards, was bullet-proof at 100 yds., though if several bullets strike the same spot they pass through in turn, after smashing up the bricks. Thus, two rows of ordinary bricks, breaking joint, each brick having a thickness of 4½ in., if kept between boards, will stop any bullets at all ranges.

Sun-dried brick walls (as used in India) 18 in. thick are bullet-proof, except after continued firing, such as 220 rounds fired in 11 volleys at 50 yds. range. Curiously, in such walls the mean penetration increases gradually from 5 in. at a range of 3 yds. up to 15 in. at 400 yds., and then slowly decreases, the reason of this being that at 3 yds. range the bullets became spherical, at 50 yds. the points became knots, while at 500 yds. the shape was unaltered.

A wall, 9 in. thick, of burnt tiles set in mud, was penetrated at ranges between 200 and 900 yds. by the small bores, but is safe against the Martini bullet. As in the previous case, the penetration increased with the range for some hundred yards. Volleys of 10 rounds were found to penetrate where single shots failed. This is probably owing to some of the bullets arriving in succession, the earlier ones preparing the way for those following. A similar 14-in. wall can be penetrated by a small-bore, especially at the joints. A 24-in. sun-dried brick wall appears to be quite proof a short time after the setting.

Fresh (green) mud walls require to be at least 4 ft. in thickness to stop bullets at any ranges.

Penetration into Steel.—With mild steel or wrought iron a thickness of $\frac{7}{16}$ (0·44) in. is required for safety; but at ranges over 60 yds. a 0·206-in. plate of hardened steel (weighing 8·75 lbs. per square foot) will stop a Lee-Metford bullet. Against the Mannlicher, a ¼ (0·25) in. plate of hardened steel is required at short ranges; this is the plate recommended for sap shields. But at 500 yds. a plate of hardened steel of less than $\frac{1}{10}$ (0·088) in., weighing only 3 lbs. 10 oz. a square foot, resisted all the small-bore bullets; this plate is recommended for field artillery shields against musketry, if such be ever adopted, as artillery are not likely to engage infantry at ranges under 500 yds.

Penetration into Timber and Sand, Loam, Shingle, &c.—The new small-bore rifles with sheathed bullets have a much greater penetration than the Martini bullets at ranges under 1,500 yds. At about 1,500 yds. the respective penetrations are about equal, while at longer ranges the Martini-Henry has a greater penetration. The shorter the range, and the harder the material, the greater is the difference in the results of the Martini-Henry and the small-bore rifles (see annexed table).

Against the small-bore sheathed bullets, green timber has only about the same resistance as dry. From the annexed table it is clear that at ranges much under 1,000 yds. timber baulks and standing trees will not generally offer much protection, except against ricochets, though at longer ranges they will suffice.

As regards sand, in firing at 3 yds. the Mannlicher bullet, with its high muzzle velocity, smashed up, and so had but little penetration, and the Lee-Metford

Summary of Average Results with ·303-inch Lee-Metford, ·256-inch Mannlicher, and ·45-inch M.H. Rifles.

Rifle.	Range in yards.	Angle of departure.	Drop of 1 in.	Calculated remaining velocity.[1]	Time of flight. Calculated.[1]	Time of flight. Observed.	Thickness of materials. Proof at a given range. Hard steel.	Mild steel.	Oak.	Elm.	Teak.	Fir.	No. of ¾-in. fir boards.	Sand.	Clay.	Loam.	Flint shingle between ¾-in. boards.	Sand between ¾-in. boards.	Loam between ¾-in. boards.	Remarks.
		° ′		f.s.	secs.	secs.	ins.	ins.	ins.	ins.	ins.	ins.		ins.	ins.	ins.	ins.	ins.	ins.	
0·303-inch Lee-Metford. Muzzle velocity, 1,975 f.s.	3	—	—	—	—	—	—	—	27[2]	33	36	48	—	20	42[3]	28	3	18	—	A thickness of 20 inches of compressed cotton will just stop the Lee-Metford bullet at short ranges. The penetration diminishes rapidly with increased range.
	25	—	—	—	—	—	·20	·44	—	32	28	45	—	—	—	—	—	—	—	
	100	—	—	1,768	0·159	—	·17	·375	21	24	24	40	—	16	42[3]	24	3	18	22	
	500	—	—	1,079	1·044	—	·1	—	13	13	14	24	—	15	40	21	3	15	18	
	1,000	1 32	22·55	787	2·699	2·5	—	—	6	9	7	16	14	21	40	18	3	15	16	
	1,500	3 16	10·8	602	4·887	4·5	—	—	6	6	5	10	9	19	38	18	—	—	—	
	2,000	5 0	6·0	458	7·759	6·65	—	—	3	4	4	8	5	16	36	15	—	—	—	
	2,500	8 25	3·14	351	11·516	10·125	—	—	2	2	3	4	4	15	30	14	—	—	—	
	3,000	14 15	1·39	271	16·374	15·095	—	—	2	2	2	3	4	12	24	12	—	—	—	
	3,500	26 0	0·699	209	22·706	24·04	—	—	2	2	2	3	4	12	15	10	—	—	—	
0·256-inch Mannlicher. Muzzle velocity, 2,285 f.s.	3	—	—	—	—	—	—	—	33[2]	42	40	60	—	12	40[3]	14	3	12[4]	14[4]	A thickness of 18 inches of compressed cotton is amply sufficient to stop the Mannlicher bullets, which all break up at short range.
	25	—	—	—	—	—	·25	·44	—	—	—	—	—	—	—	—	—	—	—	
	100	—	—	2,114	0·133	—	·2	·375	28	32	30	45	—	12	40[3]	14	3	12[4]	14[4]	
	500	0 42	—	1,297	0·863	—	·13	—	17	18	14	27	—	15	—	24	3	15	20	
	1,000	1 5	27·1	871	2·328	2·2	—	—	6	8	7	18	15	15	—	15	2	15	—	
	1,500	2 55	10·63	671	4·299	3·8	—	—	4	3	4	10	8	12	—	12	—	—	—	
	2,000	—	5·45	517	6·863	6·65	—	—	3	3	3	8	5	12	—	12	—	—	—	
	2,500	9 15	2·4	399	10·166	11·15	—	—	2	2	2	4	3	12	12	10	—	—	—	
	3,000	15 30	—	311	14·410	15·56	—	—	—	—	—	—	—	—	—	—	—	—	—	
0·45-in. M.H. Muzzle velocity, 1,300 f.s.	25	—	—	—	—	—	—	—	5[5]	5[5]	5[5]	13[5]	28[5]	17	12[5]	16	—	—	—	These results are taken from the experiments made in 1879–80, with the exception of those marked [5], which were obtained in 1894. The Martini-Henry bullet is just stopped at 50 yards by 20 ins. of compressed cotton.
	1,000	2 49	13·8	—	—	3·31	—	·125	—	—	—	—	11	12	—	12	—	—	—	
	1,500	5 15	6·87	—	—	5·65	—	—	—	—	—	—	9	12	—	12	—	—	—	
	2,000	9 7	3·56	—	—	8·50	—	—	—	—	—	—	7	12	—	12	—	—	—	
	2,500	14 25	1·89	—	—	12·55	—	—	—	—	—	—	4	9	—	9	—	—	—	
	3,000	25 20	0·69	—	—	19·65	—	—	—	—	—	—	4	9	—	—	—	—	—	

[1] Muzzle velocities used in calculations:—Lee-Metford, 2,000 f.s.; Mannlicher, 2,400 f.s.

[2] The same oak baulks were used in this case.

[3] This applies to moist tenacious clay. If the latter be soft and wet, a greater thickness will be required.

[4] The bullets break up at the short ranges, hence the greatest penetration into sand and loam is obtained at about 500 yards.

[5] The clay in this case was very hard and dry, and a greater thickness of moist clay would be required.

showed signs of smashing up. This points to a limit of muzzle velocity, beyond which any given bullet will be ineffective against sand cover. The penetration of the Lee-Metford into sand between boards is less than 18 in. at any range. The penetration of the Mannlicher at the shorter ranges is still less, owing to the breaking up of its bullets.

A thickness of 3 in. of the large flint shingle of Dungeness between boards smashed up all the bullets, and stopped them penetrating, even at the shortest ranges; but a greater thickness of fine shingle was required to do so.

The new bullets penetrate 3½ ft. into moist tenacious clay at the shortest ranges, and 28 in. into loam.

A compressed cotton bale, 20 in. thick, end on to firer, was not penetrated by any of the bullets at 25 yds. range, though some penetrated when the bale was placed with its side to the firer. At 500 yds. the penetrations were 7½ and 13 in. respectively for each position of the bale. The Mannlicher bullets broke up before they had penetrated half-way.

The general result as to the penetrations with the new small arms seems to be that, with improved steel, the same thickness will suffice as with the Martini-Henry, though more is required with ordinary mild steel.

Timber, *per se*, is no longer of any use as cover at short ranges, owing to the great thickness required, and growing timber will no longer give the protection it does at present. On the other hand, a much smaller quantity of timber, in the form of boards, made into troughs or wooden boxes, or hurdle troughs with shingle or sand between, will completely stop the new bullets. Stockades of planks with sand, shingle, or dry brick cores will now replace the heavy timber baulks formerly used. In the absence of shingle, a few inches of the macadam of roads will supply the necessary core.

Not much alteration is required in sand parapets to resist musketry, but damp clay parapets must be considerably thicker, and those of loam must also be increased, unless a hard core is inserted.

A navy coal sack containing coal 12 in. thick is impenetrable.

N.B.—The calculated remaining velocities given in the table are probably too low, because the penetrations obtained into loam at 3,500 yds. would hardly have been attainable with such low remaining velocities. Probably, as is found with the Martini-Henry, the remaining velocity increases after a certain range, owing to the gain from gravity being greater than the loss from air friction. It may also be noted that up to 3,000 yds. with the Lee-Metford, and up to 2,000 yds. with the Mannlicher, the observed times of flight are less than the calculated ones. These remaining velocities and times of flight were calculated from Bashforth's tables, but no coefficient of reduction was used.

Times of Flight.—As regards times of flight, the new arms are very superior to the Martini-Henry. Thus while with the Martini-Henry the bullets keep ahead of the sound of discharge up to about 800 yds., with the Lee-Metford and Mannlicher this occurs up to about 1,600 yds. Up to 1,500 yds., the Mannlicher has smaller times of flight than the Lee-Metford, but beyond that range the Lee-Metford has the smaller times of flight. This is a remarkable result, as the Mannlicher has the greater sectional density of the two rifles. This points to some air retardation, possibly skin friction, which increases relatively to the smallness of the bore.

A consequence of the smaller times of flights of the new bullets is, that at the longer ranges the new bullets are exposed to the influence of wind for a less time. Against this, however, is their smaller specific gravity, which diminishes slightly with the bore.

Extreme Ranges.—The greatest observed range (3,760 yds.) was obtained with the Lee-Metford with 29° elevation, and a strongish rear wind, while on the same occasion 23° 45′ elevation gave a range of 3,500 yds. But in a perfect calm, at sea level, a range of 3,500 yds. was obtained with elevations varying from 27¼° to 28½°. This shows that in the previous case the wind increased the range 250 yds. At 3,000 yds. and over, wind is the dominating factor. On calm days 29° elevation gave 3,575 yds., 32° gave a maximum of 3,650 yds., 36° gave 3,575 yards, and 45° gave 3,350 yds. These statistics show that 4,000 yds. is beyond the extreme

[4] The same oak baulks were used in this case.
[5] This applies to moist tenacious clay. If the latter be soft and wet, a greater thickness will be required.
[6] The bullets break up at the short ranges, hence the greatest penetration into sand and loam is obtained at about 500 yards.
[7] The clay in this case was very hard and dry, and a greater thickness of moist clay would be required.

range of the Lee-Metford under ordinary circumstances, but the bullet will kill up to the extreme range.

It was found that when the same range was obtained with different elevations, the times of flight varied with the elevations.

The extreme range of the Mannlicher could not be ascertained from the difficulty in hearing its bullet strike, but it is not considered to range as far as the Lee-Metford, because on the day that the Mannlicher required 15° elevation to range 3,000 yds., the Lee-Metford only required 12° 17′ elevation.

Ricochet and Deflection Experiments.—At ranges under 100 yds., on a level surface of very smooth, hard sand, with the new bullets the mean rise was 1·3846 times the mean drop, while with the Martini-Henry the mean rise is double the mean drop.

On level turf, at 1,000 yds., the mean rise of the Lee-Metford was about three times the mean drop; at 1,500 yds. about 1·5 times; at 2,000 yds. about twice, though many of the bullets on level turf did not rise, but entered the ground; at 2,500 yds. 0·43 times, but only 5 per cent. of the bullets ricochetted off the turf, and these did not range more than 200 yds. from the strike; at 3,000 yds. and over no bullets ricochetted off the turf, though there were a few ricochets off shingle at this range.

At 1,500 yds., with the Mannlicher the mean rise was about 2·3 times the mean drop. No ricochets from turf were observed at 2,500 yds. and over.

In these experiments most of the bullets which ricochetted appeared to upset.

On land, at short ranges, the deflections of the new bullets with a left-handed twist occurred both to right and left, the mean being only about ¼ as great as with the Martini-Henry, which averaged 1 in 100. The maximum observed deflection was only 1 in 114 to the right. With the Martini-Henry, all the deflections are to the right.

Angles of Descent.—The main advantage gained in the new small-bore rifles is the relative flatness of their trajectories, which are throughout very superior in length of margin to that of the Martini-Henry. At 1,500 yds. the Lee-Metford and the Mannlicher have about the same drop, viz., about 1 in 10·4, after which the drop of the Mannlicher relatively increases. The drop was very much influenced by the strength and direction of the wind. This fact must be borne in mind in dealing with the recorded drops. However, for practical purposes, the following formula, due to Capt. C. F. Close, R.E., gives a fair approximation to the angles of descent of the Lee-Metford bullet between 1,000 and 3,000 yards range, viz.:—

$$\text{cot. angle of descent} = 1{\cdot}4 \times 2^{\left(\frac{3{,}000 - \text{range}}{500}\right)}.$$

Strategy and Tactics in the East (by permission from "The Times").—Whatever other lessons we may draw from the Korean war as far as it has gone, there is one which most people seem to draw either consciously or unconsciously. Event after event has been following the tracks that thinkers on these matters had marked out for them beforehand, and the immense national value of such studies has been proved to the hilt. Much of what has been written on naval strategy and tactics of late years has been contested, sometimes warmly, and a considerable body of authorities have regarded such studies as very theoretical, more especially those which relate to naval tactics. But, now that we have seen the so-called theories applied, misapplied, or not applied at all, a distinct tendency becomes apparent to assume that there never was any dispute, and that we had all of us consistently supported the value of such studies, and consistently admitted the justness of the conclusions to which they led. Where we are likely to err now is in too readily admitting what we before denied; and in forgetting that it is knowledge of the methods by which the conclusions have been arrived at, even more than the conclusions themselves, which we ought to secure, in order to make any future conclusions we may draw as true as those seem to be which we have already drawn.

But in considering the lessons of the war in the present state of our information, there is a duty and a difficulty. If we wait until we have full and accurate in-

formation on every point, the minds to which we would appeal will have grown cold. If we use false information, we shall mislead. We must use our criticism as not abusing it. We must stick to the broad facts which can scarcely be wrongly reported, and, if we accept details which may possibly be misrepresented, we must not press them too far, and we must leave loopholes for escape.

It is well to remember that the great principles of naval strategy, which are now so constantly in our minds and on our tongues, were absent from the minds and tongues of every one of our countrymen for a long course of years. They were so familiar to our forefathers, from constant employment, that they never thought of leaving us a note of them. As the statesmen and warriors of the great war died away, their principles died with them, and the new generation grew up with ideas of naval war which were as fallaciously fanciful as those of the trade union secretary who recently attacked Lady Burdett-Coutts on the subject of industry. Thirty-five years ago we do not find a word of all that which now we are sometimes inclined to pass by as platitude. We either did not then study the question, or we studied it the wrong way. It would have been impossible for any Englishman 35 years ago to have written the letter which appears over the signature of "A Student" in your issue of the 29th ult. A hundred years ago most naval officers, if called upon, would have said it was all a matter of course. But the mere fact of its being necessary to write such a letter now shows that such truths are more on our lips than in our minds; and, not having a firm grasp of the methods by which our conclusions have been reached, we toss them about as isolated statements which after all may bear a good many different meanings. But really the conclusions all hang together. Each one by itself is arrived at (1) by the reason of the thing, (2) by the reason of other things from which it is impossible to separate it, and (3) by the appeal to experience or history.

Let us trace the events of the war in view of the conclusions which had been previously formed. Before the superiority of one fleet over the other was in any way established, the general tendency in this country was to suppose that the determining factor in the results of the war was the abstract weight or power of China, and a little country like Japan was thought to be very rash indeed. It had then to be pointed out that the abstract power of China was not in question. As far as the immediate results of the war were concerned, it was a question whether China could bring this power to bear at a given time and place. The occupation—perhaps one ought to say the conquest—of Korea was the objective, and both countries were almost equally free to pour troops into it, if the navy of the one did not interfere with the transport of the other over sea. If China could successfully interfere with Japanese transport over sea to Korea, there was an end of the first phase of the war. China would make her power felt at the proper place and time; she would put her troops into Korea in greater numbers than Japan could, and the attention of Japan would be turned from the invasion of Korea to the defence of her own waters. If, on the contrary, Japan interfered with Chinese transport over sea, Japan would land her troops in superior numbers. But this would not necessarily end the first phase of the war, because China had a land route as well as the sea routes, over which her troops could proceed. If it was a short and easy route, she might still make her power felt at the right place and in sufficient time. If it was a long and difficult route, it lost its consequence. Korea, with the sea routes to it closed, became to China what it would have been to Japan had the condition of sea routes been reversed. Japan would win in Korea with an ease much greater than we won in the Crimea, because she had been able to stop the original assemblage of Chinese troops there, and because the land route to Korea was much more inconvenient than the land route to the Crimea. Thus we had the reason of the thing confirmed by our Crimean experiences. The Japanese "naval threat" was sufficient, not only to stop Chinese transport by sea to Korea, but to lead the Chinese to doubt their naval power altogether. They were satisfied to keep the command, as they called it, of their own waters, and Japan had just the same freedom towards Korea as we had towards the Crimea.

When we had arrived at this stage there was a tendency to look for indiscriminate fighting in a jointly occupied territory. It was forgotten at first that the reason of the thing showed that there could not be common territory between

the two armies, and that, as the Japanese had access to all the ports of Korea, while the Chinese had access by only one route, from which they could not be cut off and continue to live as a force, it behoved them to fall back to such territory as was not contested, and where their one route was behind them. Here we had the reason of the thing supported by the experience of the Peninsular War to guide us. Unless the Chinese frankly evacuated Korea altogether and left the Japanese in full possession, it became certain that somewhere in the north of Korea a great military battle would be fought, which would be, strategically, Vittoria over again, and would determine in whose possession Korea should remain. I understand that military strategists consider that the fighting of that battle could not have proceeded on the lines it did in the days of the Peninsular War, because, I suppose, of the power of the electric telegraph in binding distant wings in simultaneous movement. The reason of the thing promised such methods, and I suppose Königgrätz furnished the model, if other land battles did not.

Thus we had Yamagata after Ping-Yang, as Wellington after Vittoria, with an open sea behind him, with supplies coming to him from ports close at hand, and with the enemy retreating before him out of the country he had conquered.

We have seen now that, from the reason of the thing, supported by abundant historical analogy, all that has happened so far was bound to happen, and that, had the Chinese based their action on these *data*, they would have known that, unless they began the war either by striking directly at the Japanese fleet or at least by striking at their transport near their own shores, they would seal their doom. They would fail to use their power at the proper time and place, and its abstract immensity would prove of no sort of value to them.

But, though they had failed to take possession of the Japanese sea routes, could they not treat the sea as common territory, and run an army across it by means of strong convoy? The reason of the thing, as commonly set forth, was, that if it was to be done, it would be best not to use any convoy at all. It would not be possible to run a large army across, with or without convoy, because attention was sure to be attracted. But, when a thing was to be done by evasion, it was worse than useless to risk a valuable defending fleet, as if it was to be done by force, a fleet which by the hypothesis could not win. It was not to be doubted, on the reason of the thing, that China might run a great many transports full of troops across at odd times, and if no one was looking. Humbert had landed in Killala Bay; the battalion of *forçats* had debarked in the Bristol Channel; Hoche's army, or the greater part of it, could easily have landed in Bantry Bay if it had not been afraid to do so. If done at all, it was to be done by stealth and not by fighting; it would be wrong to risk a naval force at the same time with the army. The frightful exemplars were Medina Sidonia, Napoleon, and Persano.

But the Chinese, in spite of reason and experience, united to their 7,000 troops a fleet which, though the finest they could collect, they admitted by their whole conduct to be inferior to that of the Japanese. Whether they would escape notice depended on the sort of look-out the Japanese kept; whether they would be brought to action would depend on the scattered or concentrated state of the Japanese Fleet. But, if the latter was inferior by reason of dispersion, the Chinese Fleet was simply losing an opportunity to restore the fortunes of the war. No one could foretell the event, of course, because no one could say whether or not the Japanese would avail themselves of the extraordinary blunder the Chinese were committing. In the result they did use their opportunity. The Chinese were brought to an action as unlikely to help them in any way as Camperdown was to help the Dutch. They were thoroughly beaten; they lost a considerable portion of their navy. It must be months before they can take the sea again, and probably their loss will leave them too weak to do it if they could.

So far does strategy carry us. Had the tactics of the two fleets anything to say to the result of the battle, or was winning and losing simply due to single ship manœuvring, to good shooting, and coolness? In spite of authoritative dislike to those preliminary studies on paper which must precede experiment, some such study has been constantly given in England with published results. In one of these studies, 22 or 23 years old, we find it laid down that a fleet should never approach another in any formation approaching "the line abreast"—that is, in

what a soldier would understand by "line." And the reason given is this:—It might easily be that for a time the opposing fleet, in mistake, or to deceive, might advance in a similar formation. But, if the opposing fleet meant to win it would suddenly turn the ships together into a "line ahead," which in essence is a military "column," towards either flank, or it might be, by separating into two columns, towards both flanks, of the advancing line abreast. Time, under the circumstances, would not permit the line abreast to make any counteracting movement, and the fleet in line ahead would pass one or both wings, with ship after ship pouring their fire into it or them, while the whole fire of the ships in line abreast, except the one on the extreme right or left, would be masked by their friends.

There does not seem now to be any doubt that the Japanese won their first advantage by pursuing the exact tactics that were laid down for them 22 years ago, while the Chinese made their advance to meet a fate which they were told they would meet all these years ago. I notice everywhere quite a ready tendency to blame the poor Chinese for their blunder, now that it has been exposed in practice so many years after it was exposed in theory. But I have not yet seen it recalled that, when Tegetthoff used the same formation at Lissa—even down to Ting's reported slightly angular change in it—there was nothing wrong seen in it. The lesson of the whole thing appears most momentous at this point. Because the slightly angulated line abreast was victorious at Lissa, it was highly to be commended; because it evidently was conducive to defeat at the Yalu, it is to be condemned. We are in face of the danger I mentioned at the beginning. We are in danger of approving or condemning, not on reasoned grounds—which must generally be to our national advantage—but on the instinct of the moment, supposing that what succeeds is right and what fails is wrong, which is sure to be, at some time or other, to our national disadvantage. Tegetthoff's mistake passed because the Italians did not understand how to take advantage of it. Ting's mistake did not pass, because the Japanese admiral had either thought it all out on paper beforehand, or instinctively saw how to turn it to his advantage.

To conclude, let us look how we are nationally concerned at this very moment, and how the designers at Whitehall are under the instruction of Admiral Ito, while the builders at the dockyards might be taking warning by Admiral Ting. Admiral Ito, either because he had studied the theory of naval tactics, or because the theory came to him as a practical revelation during the approach of the Chinese Fleet, abandoned his bow fire. We, with the reasoning against it, over and over again repeated for more than 20 years, have stuck to it like men. Not a month ago you published from correspondents two very strong condemnations of the Admiralty, because, as alleged, the bow fire of our ships is inferior to that of the French. The English tacticians, who have never ceased to exclaim against the provision of excessive bow fire as mere waste and mischief, have based themselves on this syllogism. Bow fire in fleets can only be used in the line abreast and its analogues; the line abreast can never be adopted, because of its danger. Therefore, bow fire ought to be neglected. At the moment I do not see what answer can be made to this conclusion.

Austria-Hungary.—In the dislocation of the troops concentrated for the Imperial manœuvres, large demands were made on the railway companies. The 1st Corps, 760 officers, 21,000 men, 320 horses, and 30 wagons were despatched in 24 trains and delivered at their respective stations in 24 hours. The 9th Corps were delivered in the same time, and required 25 trains for 600 officers, 15,200 men, 350 horses, and 45 carriages.

France.—In order to make room for the 161,477 men available for service in this year's contingent, 25,000 men of the contingent of 1891 and 36,000 of 1892 will be furloughed on the 8th November of this year. Of the 161,477 to be enrolled this year, 125,477 will serve their full three years, and the remainder be dismissed after one year's training.

Land has been acquired for a permanent camp of exercise in the vicinity of Laon; an infantry brigade will be permanently quartered there.

Considerable difficulty is still experienced in completing the colonial troops; to supply the vacancies caused by the transfer of 7,300 men to the reserve this year, only 2,429 volunteers came forward. It is proposed to ask the Chambers to sanction a premium of 1,500 fr. to each man who will prolong his service to nine years.

The formation of the two new artillery regiments, rendered possible by the transference of the pontoonering duties to the engineers, began on the 1st of this month. The 39th Regiment, consisting of 9 batteries, will be quartered at Toul. The 40th will have 6 field batteries at Verdun, 6 field batteries and 1 horse battery at St. Mihiel, and 2 horse batteries at Stenay. This brings the artillery of the 6th Corps up to a total strength of 52 batteries, viz., 9 horse, 41 field, and 2 mountain batteries, in all 312 guns.

General Saussier is forming a school for the further training of cavalry reserve officers within the district of Paris; already 600 applications to attend it have been received. ("Revue du Cercle Militaire," No. 32.)

According to "The Times" correspondent with the French Army during the last manœuvres, the attack was normally delivered as follows:—"The shooting line and supports are amalgamated from the first, and the battalion is formed in two lines, two companies in each, each company initially in a line of sections in column of fours at twice deploying interval. The front is covered by scouts, 16 to each company, thus the normal frontage of a battalion in attack is equal to its front two deep. The distance between the following lines at first is from 300 to 400 yds. The procedure in an attack is as follows:—On coming within the zone of artillery fire, the above formation is assumed, and in it the battalion approaches, as quickly as possible, the enemy's position. On arrival at about 1,200 yds. from it, the columns of fours form front in single rank, and the leading line of the battalion then becomes a single rank of men, elbow to elbow. In this formation is continued up to 700 or 800 yds. when fire is opened, and from this point the advance is continued by alternate companies or even larger units, but no doubling is allowed, and every effort is made to keep the men in hand and in good wind. Within about 500 yds. individual fire is the rule; beyond that range volleys by sections. The second line companies did not usually reinforce the first line until the latter were preparing for the assault by magazine fire at about 200 yds. range. . . . . A most striking point was the absence of depth in the formations, even at the decisive points of the attack, as regarded the troops actually making the attack and under fire. A long front, long enough, if possible, to envelop the enemy's flank, seemed to be the point aimed at. Each new accession to the shooting line carried it a little farther forward, until the last reserves gave the final impulse for the assault. . . . On the defensive, frequent counter-attacks were made by the firing line in the old French style.

"From the larger tactical point of view, the most noteworthy feature was the methodical manner in which the attack of the infantry was prepared. In rear of the line of guns, and out of sight of the enemy's position, the infantry were formed for attack as they came up from the marching columns, and not until the artillery had sufficiently prepared the attack was the signal for the advance given. Once launched, the troops moved on through the line of guns and straight for the enemy's position, with the utmost celerity and steadiness, never wavering and seldom pausing until the decisive fire position was reached."

From the above it is evident that the new regulations have effected a complete change, and one of the utmost importance in French infantry tactics. This is the attack in line in its highest development, identical in principle (if not in detail) with the Frederician method. The idea of the "blow" contrasted in the sharpest manner with the method of "attrition," the keynote of the Napoleonic system copied and applied by the Germans in 1870. How enormous the change has been will be realised by contrasting Captain Maude's account of the French manœuvres of 1891, in "The United Service Magazine" for December of that year. In those manœuvres the method of "attrition" was pushed to its utmost con-

sequences. The troops entered the zone of fire in a succession of small echelons, which presented the best possible target to the enemy's fire, the least possible fire effect in reply, and the utmost possible guarantee of disorder and want of control. Assuming the above account to be correct, and we have no doubt that it is so, then the French, by their new regulations, have effected the greatest revolution in infantry tactics since the days of Leuthen, and are now ahead of anything in Europe, though the Germans run them very close indeed.

Germany.—All reports go to show that the changes of uniform recently introduced in the infantry have stood the test of the manœuvres well. The total reduction of weight carried is 6·5 kilos., say, 14 lbs.

Italy.—The Commission appointed to determine the best range-finder has, after long and searching experiments with all known models, finally approved the "Pavese," a reflecting instrument, alleged to require no base and no tables, about the size of an ordinary watch. The "Souchier" and "Parravicino" appear to have come next in merit. The average error of the "Pavese" is given at 0·5 per cent., and it is being manufactured by the firm of "Salmoiraghi," at Milan.

("Militär Wochenblatt," No. 81.)

Japan.—We would venture to recommend an attitude of suspended judgment to our readers with regard to the Chino-Japanese War. Ten days ago the believers in the night attack as the one solution for all tactical difficulties were in high feather, but already the arrival of contradictory reports from the theatre of war have upset their premises. If Ping-Yang proves what a successful night attack may achieve, Asan shows how easily it may fail, and with what serious results. At the latter place, a correspondent of "The Times" tells us, two Japanese divisions, having lost their way in the dark, fired into each other for some time without discovering their mistake, and meanwhile the bulk of the Chinese withdrew. Seeing that the Franco-German War was fought out at our very doors, and we are only now, after 23 years, beginning to get at the actual truth, will it not be as well if we take our time before coming to conclusions on the very unsatisfactory evidence as yet before us?

Russia.—According to Russian papers, the section of the Trans-Siberian Railway from Tchéliabinsk to Omsk (450 miles) was opened for passenger traffic on the 25th August. During next year it is hoped to complete the line as far as Krasnoiarsk, 1,400 miles from Tcheliabinsk. The great girder bridges across the Tobol, Ichim Irtych and Ob cannot be ready before 1896. Meanwhile temporary wooden structures have been erected, which have to be removed at the time of the spring ice floods. ("Revue Militaire," Sept.)

United States.—*Report of the Chief of Ordnance, U.S.A.*, 1893 (reprinted by permission from the "R.E. Corps Journal").—This report is issued in a volume of some 700 pages. It commences with the report by Brigadier-General D. W. Flagler, Chief of Ordnance, to the Secretary of War, of the principal operations of the Ordnance Department during the fiscal year ending June 30th, 1893, and this is supplemented by various appendices, consisting of the reports and plates from which his report is compiled.

Several of these reports are of considerable interest:—

No. 14.—Tests of smokeless powder for small arms.

These tests were made at the Frankford Arsenal, on the following powders:—(1.) Wetteren. (2.) Rifleite S.R., S.V., by Smokeless Powder Company (England). (3.) B.N.F. (4.) Peyton. (5.) Leonard (numerous samples). (6.) Du Pont. (7.) Axtell. (8.) Troisdorf. (9.) Alters.

Of these, the Axtell and Alters powders were found to be entirely unsuited for military use, owing to insufficiency of velocity obtained, and other causes.

The results obtained with the other powders are tabulated for comparison.

I.—*Velocity and Pressure.*—For neighbouring velocities the following pressures were developed, the 220-grain bullet being used, unless otherwise noted:—

Powder.	Number of shots fired.	Charge.	Mean velocity at 50 ft. from muzzle.	Mean variation.	Mean pressure per square inch.
		grs.		f.s.	lbs.
Leonard, sample "N" ..	5	32	1,991	22·0	Under 32,000
	7	33	2,037	10·2	32,500
Leonard, sample "J"	6	31	2,019	13·8	33,500
Peyton.....	6	37	2,013	18·5	31,500
Troisdorf	7	35	1,953	12·6	34,000
Wetteren	9	37	1,962	19·6	38,500
Rifleite	9	39	1,969	21·6	45,500
B.N.F.....	12	34	1,932	10·5	47,000
Du Pont.....	5	35	1,964	9·0	54,000

II.—*Test for Moisture.*

Powders exposed to Moisture for 24 hours.

Powder.	Loss in velocity.	Pressure reduced per square inch.	Increase in weight of powder.
	f.s.	lbs.	per cent.
Peyton	40	2,000	0·64
Leonard, sample "N"	100	5,000	3·18
Leonard, sample "J"	100	5,000	2·97
Troisdorf	100	7,000	1·64

Powders exposed to Heat for 24 hours.

Powder.	Gain in velocity.	Pressure increased per square inch.	Loss in weight.
	f.s.	lbs.	per cent.
Peyton	10	4,000	0·238
Leonard, sample "N"	50	6,000	1·69
Leonard, sample "J".....	—	5,000	0·246
Troisdorf	50	10,000	1·29

Conclusions.—The Rifleite, B.N.F., and Du Pont powders are inferior to the others, as they give higher pressures without compensating advantages. The Wetteren gives very fair results, but the pressure is high for the moderate velocity obtained, and the irregular granulation often causes considerable variation in velocity. The Troisdorf gives lower pressures than the Wetteren for the same velocity, and seems to be equal to it in other respects, but requires a very strong primer to ignite it.

The Leonard and Peyton powders give the best results as regards pressures and velocities, the Leonard giving the greater uniformity of velocity, and the Peyton

seeming to be less affected by heat and moisture, and of the two Leonard powders, "N" is thought, on the whole, to have given the best results.

This powder is formed in strings like cordite, and cut into uniform grains. Its composition is given thus:—Nitro-cellulose and nitro-glycerine, with an organic substance of vegetable origin as a restrainer. These ingredients are placed in a vat, in proper proportions, and dissolved in acetone, the subsequent operations being similar to those employed in the manufacture of cordite.

The results obtained with cordite, for comparison, are:—A charge of 30 grains, which gives a muzzle velocity of 2,000 ft. secs., and a pressure per square inch of 33,600 pounds, compare favourably with this powder, while climatic influences are claimed to effect no material injury to its ballistic qualities.

No. 19.—Effect of small calibre rifle projectiles upon animal tissue and bone, by Lieut. Benet, Ordnance Department, U.S. Army.

(1.) *Object of Experiments.*—To compare the effect of bullets of large and small calibres upon the same parts of the human body, at ranges up to 2,000 yds.

(2.) *Arms and Ammunition used.*—0·45 Springfield rifle. Charge, 69 grains black powder and 500-grain lead bullet.

0·30 Springfield rifle. Charge, 37 grains Wetteren smokeless, and 220-grain lead bullet, with German silver jacket.

(3.) *Method of Conducting Experiments.*—Owing to the improbability of striking the part of the cadaver desired at the actual range in a reasonable number of shots, the experiments were conducted in a proof gallery, the cadaver being placed at a distance of 53 feet from the muzzle of the rifle.

The normal velocities obtained at the actual ranges were simulated by using a carefully-worked-out series of reduced charges. The ranges thus simulated were 2,000, 1,500, 1,200, 800, 500, 350, 250, 150, and 100 yds.

Two hundred shots were fired under these conditions, and eleven plates are attached to the report showing the effects upon certain characteristic bones by the 0·30 bullet, and ordinary and extraordinary deformations of this bullet.

Of the eight plates devoted to the photographs of bones (tibia and femur) struck by a bullet, all of them show complete perforation by the bullet; it is noticeable that six struck at 1,200 yds. show only slight fissuring, while three at 2,000 yds. show bad fractures.

Lieutenant Benet makes the following deductions. Comparison of wounds inflicted by the two bullets:—

(a.) *Zone of Explosive Effect.*—This zone was observed to extend to 350 yds. with the 0·30 bullet, and only to 250 yds. with the 0·45 bullet. Where these effects were noted with the small calibre bullet it was generally found that it was badly deformed, and that the jacket had been wholly or partially stripped off; still, cases did occur in which the bullet was little deformed or not at all. It is safe, however, to state that with an undeformable bullet the occurrence of explosive effects will be less frequent, and possibly the extent of the zone much reduced.

(b.) *Zone of Perforation.*—The effect of the small calibre bullet upon the bones was not as severe as that of the 0·45. There was less shattering, and sometimes complete perforation of the bone with little or no splintering. In the joints and soft parts the wounds inflicted by the small calibre bullet were less severe, and partook of the nature of subcutaneous wounds.

(c.) *Zone of Contusion.*—Owing to the small remaining velocity in this zone, the results obtained here could not be simulated.

(d.) *Summary.*—These experiments seem to be at variance with some made in France and England, in which the effect of the small calibre bullet on bones were said to be appalling, but this was probably due to the fact that horse bones were used, which are more resistant than human ones, and break up the bullets more easily.[1] The general deduction to be drawn seems to be that from a humani-

[1] The difference may also be due to the fact that reduced charges, giving smaller velocities within the barrel, will not give the high rotation to the bullets which they would have in reality. In fact, this consideration very materially reduces the value of the American experiments. At the same time, the above result is

tarian point of view the general introduction of the small calibre is to be desired, and that the severity of wounds would be still further lessened by a bullet undeformable at the highest velocities by contact with human bones.

Appendix 43.—On the modern infantry rifle, by Captain S. E. Blunt, U.S. Army, contains a detailed account of three selected breech actions:—The Mannlicher, model 1892 (Holland), the English Lee-Speed (Marks I and II), and the Krag-Torgensen, U.S., 1892 model.

The Mannlicher Captain Blunt considers the best of what may be termed multiple loaders. Unlike other Mannlichers, the bolt in this arm rotates.

His objections to the Lee-Speed action are—(1.) The rear locking lugs, which may ultimately produce sufficient buckling to interfere with the movement of the bolt. (2.) The partial compression of the main spring by the forward movement of the bolt, which thus brings the work on the operator. This, however, requires so slight an effort that it cannot be considered a serious objection, while the first has not been practically noted in the rifles issued.

The Krag-Torgensen fulfils all theoretical requirements of a magazine arm, and seems to give great satisfaction. It has forward locking lugs, a continuous bolt, and the main spring is compressed by the rotation of the bolt only.

C. B. BONHAM, *Lieut., R.E.*

FOREIGN PERIODICALS.

NAVAL.

Austria.—*Mittheilungen aus dem Gebiete des Seewesens.* No. 10.—Pola and Vienna. "Progress in the Science of Photography." "Water-tube Boilers and their Application to Ships of War" (*concluded*). "Trials of the new Italian Battle-ship 'Sardegna,'" with plate. "Experiments with a 12-cm. Bofors Quick-firing Gun on Armoured Carriage." "The new United States' Cruiser 'Olympia,'" with plans. "Naval Chronicle, United States, England, France, Italy, Spain, and Russia." "The New Regulations for Steam-trials in the German Navy." Notices of Books, &c.

Denmark.—*Tidskrift for Søvaesen.*—Copenhagen. No. 4. "The Torpedo in relation to present armament of Ships and Tactics." "Daily Observations and the means employed for assisting in their Calculations." "Life-saving Work." "General Notes."

France.—*Revue Maritime et Coloniale.*—Paris. September, 1894. "Electricity in America." "The Geometry of Diagrams, Economic Questions on Indicator Curves." "The Influence of Sea-Power on History," translated from Captain Mahan's work. "The Adoption of the Tricolour as the National Flag." "The Rules of War." "Naval Chronicle." "Bibliographical Notices."

Le Yacht.—Paris. 1st September, 1894. "The Inspection of the Arsenals" (E. Weyl). "The New Torpedo-Aviso 'D'Iberville'" (with plate). "The Supply of Ammunition for Q.F. Guns." "Naval Notes, Home and Foreign." 8th September. "The War in Corea" (E. Weyl). "Yachting News." "Fast Mail Steamers on the American Lakes." "The Supply of Ammunition for Q.F. Guns"

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exactly what experience against living game would lead one to expect. Our suggestion is that in future inventors should be invited to shoot dangerous game in India, on foot. The survivors' inventions only to be considered.—EDITOR.

(*continued*). "Naval Notes." 15th September. "The Appointments to Command of Admirals" (E. Weyl). "Yachting News." "The Supply of Ammunition for Q.F. Guns" (*conclusion*). "Naval Notes, Home and Foreign." 22nd September. "The Navy at Madagascar." "Yachting: the English ten-tonner 'Dacotah.'" "Electricity as applied for Propelling Boats." "Naval Notes, Home and Foreign." 29th September. "The Battle of Yalu" (E. Weyl). "Yachting News." "The Launch of the 'Descartes.'" "Remarks on the last Regatta Season in England." "Naval Notes, Home and Foreign."

Le Moniteur de la Flotte.—Paris. 1st September, 1894. "Contraband of War" (Marc Landry). "China and Japan." "Naval Chronicle, Home and Foreign." 8th September. "Security at Sea" (Marc Landry). "Corean Affairs." "Colonial News." "Naval Notes, Home and Foreign." 15th September. "The Italian Naval Academy" (Marc Landry). "Security at Sea." "The Accident to Torpedo-boat 120." "Colonial News." "Naval Notes, Home and Foreign." 22nd September. "The Italian Naval Academy" (*conclusion*). "The Lengthening of Ships." "Naval Notes, Home and Foreign." "Colonial News." "The Newfoundland and Iceland Fishermen." 29th September. "Remarks on the latest Appointments" (Marc Landry). "The General Staff of the Navy and the Cabinet of the Minister of Marine." "The Colonies, River Gunboats." "Expeditions to the Pole." "Naval Notes, Home and Foreign."

La Marine de France.—Paris. 1st September, 1894. "The Age-Limit for Naval Officers." "The Personnel and Matériel" (Commandant Z., *continued*). "Models for Yachts." "Naval Chronicle." "Mercantile Navy." 15th September, 1894. "National Defence and the Defence of the Coasts" (Rear-Admiral Réveillère). "River Navigation." "Naval Chronicle; Madagascar and the Navy, some Remarks on the Chino-Japanese War, the Question of Shells of large capacity." "The Merchant Navy: Steamboat Lines in the Mediterranean," &c.

Germany.—*Marine Rundschau.*—Berlin. September, 1894. "Our Training Ships." "On the Heating and Lighting Arrangements on board Ships, and their Value from a Sanitary Point of View" (*concluded*). "The North American Yacht Clubs." "The Monument at Cape Cross (S.W. Africa)." "Naval Notes, Foreign." "Promotions and Appointments." "Reviews of Books," &c.

Italy.—*Rassegna Navale.*—Rome. July, 1894. "Researches into the Vibration of Steam-ships." "On the Explosions in Steam-boilers" (*continued*). "Prince Henry the Voyager."

Spain.—*Rivista General de Marina.*—Madrid. September, 1894. "Appendix to the Pamphlet entitled 'Some Considerations over the Geodetical and Astronomical Connexion between Algeria and Spain." "A Theoretical and Practical Study of Fluid Compasses on board Ironclads." "On the South Pole." "The French Naval Manœuvres of 1894." "Arsenals and Dockyards." "Vocabulary of Powders and Modern Explosives." "On Steel for Guns" (*continued*).

MILITARY.

Austria-Hungary.—*Die Reichswehr*—2nd September. "Military Surgeons in Germany and Austria." 7th September. "Railways in the Tyrol." 5th September. "The Naval Manœuvres in England," a severe criticism of our naval readiness. "From the Indo-Dutch Theatre of War." 14th September. "Army Inspections." "Mobile Infantry," project for organizing infantry companies for transport on breaks, &c. 16th September. "The Manœuvres at Landskron. I." 19th September. "The War Budget for 1895." 21st September. "The War Budget for 1895." "The Manœuvres at Landskron." "Correspondence from Turkey." 23rd September. "Science and Soldiers." "The Swiss Manœuvres, 1894." "The War in the East." 26th September. "In Parliament." "The Manœuvres at Landskron." "The Swiss Manœuvres, 1894." 28th September.

"The Manœuvres at Landskron." 30th September. "The Representation of the Army in our Parliaments." "The Manœuvres at Landskron."

France.—*Revue d'Artillerie.*—September. "On the Pitch of Screw-threads in Breech Mechanisms." "The Heavy Artillery Material of the German Army." "Smokeless Powder in the Austro-Hungarian Field Artillery."

Journal des Sciences Militaires.—September. "The Object of Strategy," by M. A. G., worth reading; mostly a review of General Berthaut's "Principes de Stratégie," which is recommended with reservations. "Dernier Effort," by General Philebert. Deals with fire discipline in the French Army; read. "La Loi des Cadres." "The Individual Instruction of the Soldier," M. Gervais. "Horse Artillery with Cavalry," Ducassé. "The Campaign of 1814." Weil. "The Employment of Artillery." "The War in Mexico."

Le Spectateur Militaire.—15th September. "Second Contingent and Anticipated Furloughs," *à propos* of the Ministerial Circular of the 1st August. "The New Infantry Regulations," L. Brun. "General Gallifet's Instructions for the Manœuvres." 1st October. "The Fort of Aboukir" in 1789 and 1801, with two plates. "The New Regulations for Infantry," L. Brun. "Campaign on the Loire in 1870—1871," de Guymarais.

Revue du Cercle Militaire.—No. 35. "A German Criticism of our New Infantry Regulations," discussion of an article in the "Jahrbücher." "Fortress Manœuvres," introductory to the recent operations round Vaujours. "The New German Field Service Regulations." No. 36. "Mr. Maxim's Flying Machine," mostly from "Engineering." "Fortress Manœuvres," very interesting details. "New Organization of the Remount Service in Germany." No. 37. "More about Flying Machines." "The Fortress Manœuvres," complete detail of the work done, with maps. No. 38. "The Fortress Manœuvres" (*continued*). "The Army Manœuvres," worth reading. No. 39. "The Battle of Sehoutelma," fought between two tribes in the Sahara, with map. "The New Portuguese Army Act and Disciplinary Regulations."

L'Avenir Militaire.—4th September. "The Interior Economy of a Squadron," a practical article on details of French cavalry life. "La Grande Indignation du Général Cluseret," an amusing article on the General's indignation at the civilities recently exchanged between French and German soldiers on the frontier. "Dismounted Captains of Infantry." "King Behanzin at La Martinique." "Reports of Manœuvres." 7th September. "Young and Old Soldiers." "Skeleton Companies." "A Triple Alliance in Africa," proposal for an alliance of France, Portugal, and Turkey against English aggression as incarnated in Mr. Cecil Rhodes. "French and Germans," comparison of effectives. "Reports on Manœuvres." 11th September. "Le Comte de Paris." "The N.C.O. Question," comparison of French and German conditions. 14th September. "Paper Effectives." "The New Infantry Regulations, IV." "Horses for Infantry Purposes." "The Manœuvres." 18th September. "Germans and French," comparison of effectives, and attack on the Government policy. "Infantry Tactics," brief summary of the views of three French authors, Commandants Nigote, Welter, and General Libermann; worth reading. "The Manœuvres." 21st September. "M. de Freycinet," attack on Freycinet, founded on Colonel Secretan's "Armée de l'Est." "The Manœuvres." 25th September. "The Anticipated Furloughing of the Classes of 1891 and 1892," discussion of Parliamentary debates on this proposal. "Le Boucher d'Abbeville," revelations about the meat supply of the troops. "Juste Mesure," an attack on General Mercier, warning him not to forget the soldier when playing the part of orator. "Fortress Manœuvres at Vaujours." 28th September. "Madagascar," study of the conditions for a coming campaign. "The Colours of the Pontoneers."

Revue Militaire de l'Étranger.—September. "The Military Organization of the Ottoman Empire," with map; read. "The Report of the Director-General of Recruiting in Italy." "The Effectives of the Bulgarian Army, 1894." "Italy:

Opening of New Lines." "Russia: Improvements in the Railway Communication of the Empire."

Revue de Cavalerie.—September. "Practical Ideas on the Education and Instruction of the Soldier, with Special Reference to the Cavalry," read. "The Italian Cavalry" (*continued*). "The Paces of the Horse," revealed by experimental methods with illustrations indifferently executed, *continued* from the April number; should be read. "The Charge," cavalry *v.* cavalry; recommends pace in the charge, and incidentally discloses the point of efficiency reached in the French cavalry. "Lessons in 'Chic,'" interesting and amusing, on uniforms and how to wear them. "Long Distance Ride from Haguenau to Rome." "Equitation, Military and Civil," reply by M. F. Muvany to Count Gontaut-Biron.

Germany.—*Militär Wochenblatt.*—No. 74. "Sunday in Cantonnements." "Experiments with a 12-cm. Q.F. Naval Gun on Armoured Mountings in Sweden." "Summary of recent Progress in Military Inventions," worth reading. "Sale of Horses belonging to Retiring Officers," proposal to establish a central exchange bureau for officers' chargers. No. 75. "The Japanese Army." "Soldier's Sore Foot," very interesting lecture by Dr. Rittershausen, reprinted. No. 76. "Movable Turrets." "The Reform of the Russian Military Educational Establishments." No. 77. "The Training of East African Levies to meet an Enemy armed with Spears, &c." "Correspondence from Austria-Hungary," very interesting, about the K. K. Landwehr. No. 78. "Calling out of the N.C.O.'s of the Reserve in Russia." No. 79. "The Training of East African Levies." "Is War an Inevitable Condition of Modern Society?" No. 80. "The Field Service Regulations of 20th July, 1894." No. 81. "The New French Infantry Regulations." "The Capture of Kassala," compiled from General Baratieri's report. "The Chinese Army." "New Italian Railways," summary of progress. No. 82. "The Preparation of the Infantry Attack by Artillery," worth reading. "The New French Infantry Regulations." No. 83. "Modern Fortification."

Neue Militärische Blätter.—September. "Notes about Field Artillery," comments on customs of the range grounds, faults committed, &c.; should be read. "The Cavalry Divisions of the IIIrd and Meuse Armies in the operations against the Army of Chalons." "Preserved Foods in Time of War," showing technical progress up to date. "Bazaine in Metz." "Port Arthur," interesting description of docks, arsenal, and buildings.

Deutsche Heeres Zeitung.—No. 70. "New Regulations for the Italian War Schools." No. 71. "Torpedo-boat Destroyers in the British Navy," about the "Havoc," "Hornet," &c. "The Defence of the Churchyard at Beaune-la-Rolande," by Captain Hoenig; very interesting. Nos. 72, 73, 74, 75. "The Field Service Regulations of 1894." "The Defence of the Churchyard of Beaune-la-Rolande" (*continued*). No. 76. "General von Cranach." No. 77. "The Naval Action at Hai Yung-Tau," known in England as the battle of the Yalu River; nothing new. "Is a reform of the Kriege Academy necessary?" No. 77. "The Rifle of the Future," review and comment on. Wille's "Advantages and Drawbacks of the New Rifle," suggests the possibility of a 0·2 bore, *i.e.*, 5 mm.

Switzerland.—*Revue Militaire Suisse.*—"The Manœuvres of the 4th Corps." "Le Comte de Paris."

NOTICES OF BOOKS.

History of the British Standing Army, A.D. 1600 *to* 1700. By Colonel CLIFFORD WALTON, C.B., Assistant Adjutant-General. (London: Harrison and Sons, 1894.)

Though there have been innumerable military works on the subject of the army published in England, there are only two which can lay claim to be histories (the "Army Book for the British Empire" does not pretend to the title), and these, curiously enough, were the efforts of Militia officers:—1. "Military Antiquities, respecting a History of the English Army from the Conquest," by Captain Francis Grose, F.S.A., 2nd Royal Surrey Militia; and 2. "The British Army: its Origin, Progress, and Equipment," by Captain Sir Sibbald D. Scott, Bart., F.S.A., Royal Sussex Artillery Militia. Neither of these, however, can, in any sense, be said to be exhaustive; and it cannot but be regretted that Colonel Walton's untimely death has prevented the completion of a work which, judging from the painstaking and conscientious research exhibited in the first instalment, would have proved a most valuable addition to military literature. The book, together with the three volumes of original illustrations, has been kindly presented to the Royal United Service Institution by his widow; and it is not without a touch of sadness that one reviews what has been the almost life-long work of Colonel Walton, a work which it was his ambition to have lived to complete.

The history is divided into 32 chapters, consisting of 887 pages, including appendices and index, which is not unreasonably bulky, considering that it embraces almost every detail connected with the gradual growth of the organization of the British Army, its campaigns, its arms and accoutrements, clothing and equipment, regimental economy, recruiting, military law and punishments, rewards and honours, and general administration—each of which is treated with a thoroughness which is beyond praise. *The Saturday Review* recoils at the thought of the bulk to which Colonel Walton's work would have attained if his scheme had been fully carried out. Scott's "History of the British Army," not nearly so thorough a work, contains three volumes of 1,756 pages in all; Hamilton's "History of the Grenadier Guards," three volumes of 1,501 pages; while Napier's "History of the Peninsular War," covering only seven years (1807—1814) occupies six volumes and nearly 3,600 pages. Surely, then, it is not unreasonable for a comprehensive history of every detail connected with the army for 100 years to contain 887 pages!

The first 20 chapters of Colonel Walton's history are devoted to the rise and progress of the standing army, embracing the origin of the cavalry as far as the 8th Dragoons and 7th Dragoon Guards, and the infantry as far as the 27th Inniskillings and including the old 94th (Scots Brigade), with the campaigns in Tangier, Ireland, and Flanders. And this portion of the book shows abundant evidence of the patient and intelligent research displayed by the author. The Coldstream Guards, with their strong aversion to being called "Coldstreams," will not welcome the evidence that the regiment was officially styled so as early as 1670. In the "London Gazette" of that year they appear, in the account of Monck's funeral, as "the regiment of Coldstreames." Another favourite idea in support of their motto of "Nulli secundus," that the regiment was never the Second Foot Guards, will have to be abandoned. They were so styled as early as 1665, as shown by Colonel Walton; and as late as 1758. A friend of the writer of this review purchased at the sale of H.R.H. the Duchess of Cambridge's books at Puttick's in 1889, a MS. of the "Colours and Badges of the Second Regiment of Foot Guards, called the Coldstream. From an account given by His Grace the Duke of Marlborough, as Master of the Great Wardrobe, 1758."

In a book of so comprehensive a nature as that before us, it is scarcely to be expected that the author would be able to steer quite clear of error; and in his account of the Marines he falls into a mistake. The Maritime Regiment raised in 1664 was not in existence in 1692 in Flanders, and was not disbanded between that date and 1697. It was, as is clearly shown in Major Edye's book, disbanded in 1689.

Colonel Walton was, as a rule, religiously consistent in quoting original and contemporary authorities for his assertions; but it is very essential that the authority should be unquestionable. If an authority should happen to be a doubtful one, the result may be to perpetuate error and misstatement. In treating of Marlborough and his earlier campaigns, too much reliance appears to have been placed upon Lediard. After allowing himself to be led into absolute error in regard to the parentage of John Churchill, Colonel Walton relies too much upon the same authority for his account of the young soldier's bravery at the siege of Maestricht in 1673. We are told that, in 1672, John Churchill was appointed captain of the Grenadier Company of a newly raised regiment commanded by the Duke of Monmouth; and in another portion of the book, that Grenadiers were not introduced into the English Army until 1678, six years later! As a matter of fact, that branch of the Service was first introduced into England in 1677, and Lord Wolseley falls into a similar error in his "Life of Marlborough." In that year Captain Lloyd of the King's Regiment of Foot Guards was directed to instruct and train, for the duty of Grenadiers, a squad of 54 men composed of two men selected from each of the 17 companies of the King's Foot Guards, and two from each of the 10 companies of the Coldstream Guards; it is fully explained in an article which appeared in the "Illustrated Naval and Military Magazine" for May, 1888. Young Churchill was in 1672 captain of a company—not Grenadiers—in the Maritime Regiment, but was given leave of absence to serve with the French Army. If he commanded a company of Grenadiers at the storming of Maestricht in 1673, which is doubtful, they must either have been French Grenadiers which had been in existence some years before we adopted them, or, on the other hand, Grenadiers formed in France in the regiment which the Duke of Monmouth raised in England for service in Flanders. There were no Grenadiers in any regular English regiment, the commissions in which were given in England, prior to 1677.

Colonel Walton devotes a chapter to Recruiting and the Reserve Forces between 1600 and 1700, but gives only a few pages to the Militia, which is strange considering the important part it played before the introduction of a standing army, and its subsequent political significance. In stating that, prior to the accession of James II and up to the end of the century, "the English Militia does not appear to have been utilized at all," Colonel Walton seems to have forgotten the English history of that period. What of the Duke of Monmouth's rebellion in 1685? Most of the Militia regiments of the Midland and Western Counties were called out on this occasion. They were not to be relied upon to carry out the Popish policy of the Court, and they retired certainly at first before the Duke's adherents, but no long time after his landing at Lyme he was defeated and captured by Sir William Portman and Lord Lumley at the head of the Militia of their counties, and the reward of 5,000*l.* to be given to whoever "should bring Monmouth in" was ordered to be distributed amongst these regiments, the Oxfordshire and Somersetshire. Again, surely Colonel Walton must have heard of the descent of the French upon the coast of Devonshire in 1690, when the whole nation was alarmed. Camps of Militia were formed at Blackheath and Hounslow, where they were reviewed and thanked in the name of the Queen by Lord Marlborough. The Militia of the southern and western counties were all called up, and the "Mercurius Reformatus" newspaper of 5th September tells us how thankful the people were of the opportunity it gave for the "trial of the usefulness, loyalty, and bravery of the Militia of England," showing that they "had not forgotten the military glory of their ancestors."

It will, perhaps, supplement Colonel Walton's remarks upon artillery to say that it was customary, before 1687, to attach guns to infantry battalions. It will be found, by a Warrant of 16th June, 1685, that two guns were attached to each of the regiments of the army during the Monmouth rebellion. At Sedge-

moor they were of great service to the King's army; indeed they practically decided the day. If we mistake not it was on this occasion that the warlike Dr. Mew, Bishop of Winchester, who accompanied the army, lent his horses to draw the guns.

The chapters on Arms and Accoutrements, Clothing, Drill, &c., have been written with the utmost care, and, in the great majority of cases, with an accuracy rarely met with; but space will not admit of a further reference to Colonel Walton's work. A very valuable addition to it are the three large volumes containing the original illustrations which it was intended to publish along with the literary portion, but which had to be abandoned in consequence of the death of the author and the impossibility of guaranteeing the enormous cost of their reproduction. But it will interest readers of this journal to know that the author's widow has kindly presented them to the one place in England where they will be most appreciated and referred to—the Royal United Service Institution. However, it is just as well to point out that, though most of the details of the uniforms, &c., are the result of careful research, and are supported by authorities and notes, it is impossible to accept them as perfectly accurate. It is clear that whilst many of the peculiarities of dress worn by the various regiments have been accurately portrayed, the remainder of the dress is frequently merely made up from a contemporary figure, and, therefore, not to be accepted as infallible.

As an instalment of a comprehensive history of the British Army, there can be no two opinions as to the merits of Colonel Walton's book. Its compilation is the result of some 20 years of close and patient study and research; and the few errors which one succeeds in detecting is some evidence of its general accuracy. The price, 21*s.*, places it within reach of every regiment, in whose library it will doubtless find a place. R. H.

Kriegslehren in kriegsgeschichtlichen Beispielen der Neuzeit. Von Scherf, General der Infanterie, z.d. Erstes heft Betrachtungen über die Schlacht von Colombey-Nouilly. Berlin: Mittler, 1894. Price 5 marks.

The purpose of this work is to prove the necessity of some ordered form of attack which shall ensure the co-operation of the constituent elements which make up the higher tactical units—brigades, divisions, and the like—in the manner best suited to develop their full fighting capacity on the field of battle, something, in fact, between the rigid normal attack of former days and the confusion which will, in Scherf's opinion, result from leaving everything to the judgment of the company leaders. With this object before him, he analyses in minute detail the course of the Colombey-Nouilly action, and, naturally, has no difficulty in disclosing a total absence of all combined action and a boundless state of confusion; he is certainly not one of those who reason that because the Germans won in 1870, therefore whatever they did may be safely taken as a model for imitation. But it appears to us that in attributing the confusion that undoubtedly did arise in the German ranks to the independence of the company leaders, he is going further than the facts justify. Had the company leaders been adequately trained beforehand, would the same confusion have been apparent? That is the point he really requires to establish. With all due deference, we venture to suggest that it would not have been, and we base our opinion on purely practical grounds. These errors, we submit, were primarily the consequence of insufficient practice in peace in the art of exercising this independence; the employment of troops in action is an art, not a science, and cannot be minutely described in text books. As well might one attempt to teach a man the exact positions he must successively occupy in a game of polo or football. What is really required is the habit of playing together, the want of which will rob the best of teams of half their value. If troops are, or have been, habituated by practice to work together on the manœuvre ground, that is to say, always to occupy the right position with reference to the other troops around them, this right position being regulated as much by the conditions imposed both by the arms in use and the nature of the ground as by the actual efficiency of the men and the talent of their several leaders, then reasoning by the analogy of all games and sports with which we are acquainted, we shall have the very best

guarantee against this confusion he deplores and fears that fallible human nature can devise.

That this point of view should not strike the General does not surprise us. The idea of "playing together," in the sense we use it in England, is very essentially our own; it is the true interpretation of Wellington's celebrated saying about the battles of the Peninsula being won on the playing fields of Eton. "Playing together" implies an absence of self-interest in the individual, and a loyal co-operation for the common good that the military student painfully misses in the records of the Napoleonic epoch, from whichever point of sight he studies it. Read Marwitz, Marbot, or, indeed, any book of memoirs that can be mentioned, everywhere the same want of subordination of self to the common good strikes one forcibly, and those who have, in addition, been compelled to study the modern political history of the Continent are aware that there is very little evidence to show that the same tendency is less active now than it was formerly. The German Emperor sees this weak point thoroughly, but outside the commissioned ranks of his army, in which, thanks to the institution of the regimental mess system, copied from us, the idea has taken root. It is very evident, from the perusal of the daily press of that country, that his insight is not shared by the bulk of his people. Scherf, of course, writes for his own countrymen, and, therefore, may be right in endeavouring to legislate for every possible contingency; but it is long since he lived in a regimental mess, and we venture to doubt whether he really recognises the enormous influence for good they have already exercised.

As far as his teaching applies to us, we think that, though in peace-time, or with hastily formed commands in war, we run much of the risk he indicates, yet with troops trained under the same leader, and with the enemy in front of us, then when once we realize that the art of tactics is only the application of the common sense habits we have acquired on the cricket, polo, and football grounds in peace, we need not fear the repetition of the scenes in the Franco-German War he so graphically and instructively describes. The duty of being always in the right place relatively to one's comrades, whether we call them forwards, half-backs, and backs, or fighting line, supports, and reserves, is identical in principle, and will come as a second nature to our men, once we have realized that no man can escape from the consequences of his own acts by shunning action, and that the art of command is the training of one's subordinates to act on their own responsibility.

Old Sword Play. By Captain ALFRED HUTTON, F.S.A. London: H. Grevel and Co. 1892.

In the above-mentioned work, Captain Hutton has, after infinite study and research, reduced into a marvellously concise form the methods taught by the most illustrious masters of the 16th, 17th, and 18th centuries.

To modern students of old sword play, the lessons here given in the various weapons render practice comparatively easy, as the old cumbersome phraseology has been transposed into modern technical terms. Thus a vast field of interest has been opened to all lovers of the science of the sword.

The work is divided into three periods, viz., the 16th and early 17th century, the "transition," and the 18th century.

Following the introductory chapter, we come to the two-hand sword, compiled from the works of Marozzo (1536), di Grassi (1570), Joachim Mayer (1570), Jacob Sutor (1612), and Alfieri (1653), well illustrated with reproductions from the first and last named.

The next chapter brings us to the rapier and dagger, which, as Captain Hutton truly says, was the most complete development of the various systems in which an auxiliary weapon was carried in the left hand. It is illustrated by reproductions from Alfieri (1653).

Chapter IV takes us back chronologically to the sword and buckler, which gave way to the more perfect rapier and dagger just mentioned. It is particularly interesting, as it includes *in extenso* the picturesque "progressions" of Marozzo (1536), from whose work it is illustrated.

The rapier and cloak, and the dagger and cloak, are next touched upon, with reproductions from Alfieri (1653) and Marozzo (1536) respectively.

To the "case of rapiers," Captain Hutton devotes more attention, as being so little known, and still less practised, even during their own period. References are made to Marozzo (1536) and di Grassi (1570), with reproductions from them.

The following chapter comprises the "transition" from the long rapier to the *épée courte*, and is full of interest. Frequent reference is made to one of the very rarest works, that of Phillibert de la Touche (1670), and to de Liancour (1686), with reproductions from both.

The third period—that of the *épée courte* proper—is based upon the interesting "Nouveau Traité" of Girard (1737) and the famous work of Angelo (1763). The illustrations are from the latter, and from Weischner (1766).

Captain Hutton's work shows wonderful power of selection when the magnitude of the undertaking is taken into consideration.

The whole book, containing 57 plates, is a carefully executed masterpiece, and should be studied by all interested in fence.

Die Verluste der Deutschen Armeen im Kriege gegen Frankreich, 1870–71. Von Dr. ENGEL, Director des Königlichen Preussischen Statistischen Bureaus. Berlin, 1872. Verlag des Königlichen Statistischen Bureaus.

Seeing that nine-tenths of current military opinion is based on the assumption that the deadliness of modern breechloader fire necessitated a change from the old close order line formation traditional in the British Army, it seems strange that the above-mentioned work should have attracted so little attention in this country.

Published by the department whose special duty it is to collate and verify all figures relating to this most important matter, it forms the best evidence by which to test the correctness of our premises. In our opinion it conclusively disproves the assumptions on which so many of our British writers rely. No great war waged with the same determination was ever fought out with a lower sacrifice of life in proportion to the numbers actually engaged, considering only the losses on the battlefield, for all practical purposes we can take the average number of Germans employed, or held ready to be employed, across the Rhine, at one million. Dr. Engel's figures show that of these only 28,000, in round numbers, fell on the field or died of their wounds from the date of mobilization to the 31st of May, 1871, or a bare 3 per cent. of the numbers actually engaged. The deaths from disease, corrected for those who would any way have died in the ordinary course of events, was fractionally under 2 per cent., or in all 5 per cent. covered the total loss. Now the death-rate in our own service in India in the pre-mutiny days averaged over 6 per cent., and these had never the smell of powder to cheer them except in the three volleys over the open grave in the cemetery, where, as far as our own experience goes, it has precisely the opposite effect. Considering only the deaths in action, and even including all casualties due to tactical blunders and the general ignorance of the conditions of active service, unavoidable in peace-time training, the average rate is far lower than we meet with in any other great battles recorded in military history. To arrive at an approximation to the true average we should in fairness eliminate all cases in which from ignorance of the power of the enemy's weapons the Germans committed gross tactical mistakes which entailed their own punishment; had the conditions of the new game been properly understood these blunders would not have been made, and as a consequence the death-rate would have been perceptibly lowered; at the same time it must be pointed out that tactical blunders have been made in all ages, and when made have generally been more severely punished. Compare, for instance, the fate that overtook the Imperial Guard at Waterloo, and the punishment incurred by the Prussian Guards at St. Privat.

Our proper course to derive sound tactical deductions, especially as to the applicability of certain formations to modern conditions, is to leave these exceptional incidents from our calculations. The average percentage of loss in battle will then be found to fall very low indeed, and consulting the tables of regimental losses, we shall find an explanation of the confusion and dissolution of all order, which was

undoubtedly a new feature in military experience, very different indeed to that usually put forward. From these tables it becomes evident that the heaviest loss fell generally on the best troops. For many reasons too long to enter on here, there was a very great difference indeed between the quality of different corps and contingents and also between the regiments of the same commands, and the incidence of the bullets sought out these differences and arranged the regiments in their proper order of merit.

The conclusion of the whole matter is this: in victorious warfare, losses, locally, are in exact proportion to the discipline of the troops engaged, and bear very little relation to the formations in which they fight, always presuming that gross blunders are not committed. If, therefore, the object of tactical training is the diminution of local loss, then the simplest way of arriving at that desideratum will be to avoid all drill and training whatever. The troops then will break and run at the first shell, and the local losses will be exceedingly small unless quarter is refused to prisoners. Again, referring to the regimental losses, and including all causes, we find that only one regiment (the 16th) slightly exceeded a percentage of 16 of deaths, and six only exceeded 10. Now compare these percentages with the deaths from sickness alone which our regiments have to face not once in 20 years only but in the ordinary course of their duty. Look at the monument in Mean Meer churchyard alone, to the 82nd Regiment, and how many more might not be cited? Even in the last twelvemonth we read of 90 deaths out of 600 men of the East Lancashire alone, and in Peshawur the proportion is nearly as high. Does it not seem shortsighted, to put it mildly, to shake men's nerves prematurely by persistently dwelling on the horrors of the battlefield when, judging by these figures, they run worse risks in their ordinary peace-time service? The Germans themselves know well the injurious effect on discipline in the field, and indeed on their tactical handling, that resulted in their army from the exaggerated ideas of the power of the new weapon they were called on to face, which inventors and newspaper correspondents had previously disseminated.

The above lines do not by any means exhaust the interest of this volume. We can only trust we have said enough to direct attention to its pages.[1]

Czar and Sultan. By ARCHIBALD FORBES. London: Simpkin, Marshall, Hamilton, Kent, and Co. Price 10*s.* 6*d.*

This is certainly one of the most attractive and generally readable books Mr. Archibald Forbes has given us, and we would most especially recommend it to those young officers who do not yet, by actual experience, know what the subjective impressions of war really are. Even to those who have seen fighting, but only as

[1] As a proof that it is not only in India that our peace-time death-rate runs high, the following figures, kindly supplied by a correspondent, are subjoined:—

Epidemic of Yellow Fever, Bermuda, 1864–5.

N.C.O.'s and men only.	Av. strength.	Attacks.	Died.	Ratio of deaths per 1,000.	Officers.	Av. strength.	Attacks.	Died.	Ratio of deaths per 1,000.
Royal Artillery ..	209	112	29	138·75	R.A. ..	9	8	2	222·22
Royal Engineers ..	171	91	28	163·74	R.E. ..	6	5	2	333·33
Line Regt., 2nd Queen's ..	750	291	112	149·33	L. Regt., 2nd Queen's	24	8	3	125·00
Civilians	11,450	3148	237	—					

against savage weapons, we would warmly recommend it, and it comes in very opportunely in continuation of our remarks on Dr. Engel's statistics given above.

There are two points to be borne in mind in training either one's self or others for war: on the one hand, it is bad for the young soldier to go into action underrating the subjective impression that the sights he will see around him will make on his will power; on the other, it is equally bad that he should confound the subjective impression with the actual objective truth. If he underrates them in the former case he will be frightened when face to face with the subjective reality, and imagine that his instructors have misled him, and if he blindly accepts the extreme consequences of his subjective informers he will be inclined to "funk" before he is face to face with the objective truth at all. That this statement is well within the facts of the case we imagine no war-experienced man will question; things look very much worse at first sight than more accurate subsequent information prove them to have been, and the amount of harm which may be done by disseminating sensational accounts of the power of the weapons to be faced is apparent to every student of modern tactics. Modern German tactical writers make no secret of it; the terror such reports, as to the power of the new weapon they were about to encounter, had spread did more to shake their discipline before the war of 1870 than all the French artillery fire throughout the whole campaign. Indeed, on no other hypothesis can the phenomena of that war be explained, for the men of the old King's German legion, fighting side by side under identical conditions with our men in the Peninsula, proved to us abundantly how little there is to choose between the fighting qualities of the two races. This war of which Mr. Forbes treats is a different one, no doubt, but its lesson is nevertheless essentially the same, for history is there to show us how gamely the Russians could die under similar conditions.

A man should know not only the actual risk he takes, but how that risk will present itself to his eyes when face to face with it, and in bringing out this work we consider that Mr. Forbes has deserved well of the whole army. Perhaps he has underrated the strain, for, though he puts the words into the mouth of a young untrained boy, he describes the things actually as they appeared to him, a war-taught veteran, which is a different thing.

There is subjective truth in every line he writes; from his position, say with the guns, for he could not well have written in the infantry fighting line, he could not have seen anything than what he describes, the dust spurting up from the bare brown plain, the close order fighting line melting into the ragged rush of skirmishers, the little dark spots left behind in ever-increasing numbers, all this is exactly as he tells us, but who but the man who subsequently collates the figures can tell us how many or how few of the little dark spots left behind subsequently turned up at the bivouac fire when night threw her sheltering veil over the line of their retreat? We may admit, and, indeed, on every count we are inclined to believe, that the absence of any idea of quarter on either side rendered the fighting more obstinate in the Russo-Turkish war than in the Franco-German, but it is certainly artistically correct that the boy who gives his experience in this book should report what he saw purely subjectively, and, having no scale of previous experience with which to work out comparisons, should describe the thing in all its dramatic intensity; to have obtruded his own ideas as to how, by better handling of the troops, the losses might have been minimized, would have been a crude error of design. As for the portraits and character sketches it contains, they are strikingly vivid, and the description of the ground fought over will always remain of the greatest value.

As a means of cross-checking Mr. Forbes's statements, we strongly recommend Graf Pfeil's "Experiences of a Prussian Officer in the Russian Army;" as the Graf served both as regimental and staff officer throughout the campaign, he is able to throw light on many points of interest. Kouroupatkine's book should also be studied. He was Skobeleff's Chief of the Staff, and therefore in a position to see and explain much which, even to the most skilful special, must have remained a sealed book. On the whole it is remarkable how in the main, allowing for the personal equation, the three agree.

Ways and Works in India. By G. W. MacGeorge, M.I.C.E. Westminster: Archibald Constable and Co. Price 16*s.*

We strongly recommend this book to officers of all ranks going to India, and even others, in all parts of the world, may study it with advantage; the more widely a knowledge of the great works carried out and the principles of administration and organization involved therein is diffused the better it will be for the whole Empire. Older officers do not need to be told the value of accurate information as to the resources of a country, but younger ones are apt to imagine, even when they realize its importance, that they will have ample opportunity to make up for lost time when they grow older, but experience shows how vain the idea is; one drifts away from the country, and perhaps years elapse, until one day war breaks out, and in the hurry and confusion of a campaign there is neither time nor opportunity to make up the lost ground. We have only one fault to find with this work, viz., that it is a volume too short; greater and more living interest would have been given to it if the details of execution, the hardships and dangers overcome, had been dealt with at greater length. The book is well illustrated and provided with maps, which might advantageously have been given on double the scale. Colonel Vibart's "Addiscombe," noticed in the last journal, will supply the want indicated above.

The Horse World of London. By W. J. Gordon. London: 56 Paternoster Row. Price 2*s.*

This little book makes no claim to being a scientific treatise, but it gives, in a readable form, facts and figures relating to the supply of horses in London, useful to officers studying the mobilization problem. One point we have gathered from it may strike some of our readers as original, viz., that the soldiers are very much better horse-masters than the civilians, the average life of the 'bus horse being only 10 years, with 5 of actual work, against 20 in the cavalry and artillery, with 15 of actual work, who nowadays, in most armies, do faster and more trying service.

Federal Britain: or, Unity and Federation of the Empire. By F. P. de Labilliere. *With a Chapter on Imperial Defence.* By Major Sir George Sydenham Clarke, R.E., K.C.M.G. London: Sampson Low, Marston, and Co. Price 6*s.*

This book consists of a series of papers, originally contributed to the Royal Colonial Society, and now brought together within one cover for convenience of reference. The author's name is so well known as a staunch supporter of the "in unity is strength idea" that no further comment on it is necessary. It is readable from end to end, and Sir George Sydenham Clarke's paper is quite excellent.

My Paris Notebook. By the author of *"An Englishman in Paris."* London: Heinemann, 1894.

This book has been sufficiently reviewed in current papers and magazines. Its value to military readers lies in the side lights it throws on points in the Napoleonic legion and character sketches of men still living about whom it may be worth while to be well informed.

The Franco-German War, 1870–71. By Major J. Scheibert. Translated from the German by Major Ferrier, D.S.O. and R.E., and Mrs. Ferrier. *Chatham:* Mackay and Co. Price 7*s.* 6*d.*

A short readable summary of the Franco-German War, useful to officers who may not have time to master the official account. We detect a good many errors in the tactical part of the different battles.

With Havelock, from Allahabad to Lucknow. London: Sampson Low, Marston, and Co. Price 2*s.* 6*d.*

A collection of letters written on the march by Lieutenant Groom, of the 1st Madras Royal Fusiliers, to his wife. He was wounded at Lucknow in a sortie on

the 5th October, and died in the Residency Hospital on the 21st of the same month. Works of this kind are always interesting, and frequently being written at the moment and without idea of publicity they furnish the best first hand evidence as to the time and place of the occurrence of certain events, and also as to rumours current and the general feeling in camp at a given moment.

Trois Ans au Régiment. By VICTOR MONMILLION. Paris: Librairie Parisienne, 12, Rue des Pyramides. Price 3fr. 50c.

"L'Avenir Militaire" devotes two columns to a careful review of this book. It appears to contain an accurate account of the daily life of a French soldier of the new army, and the picture is not "couleur de rose," but it will well repay the perusal of those interested in ascertaining the view the French private himself takes of the joys of a military career.

L'Armée de l'Est. By Colonel SECRETAN. Neuchatel: Altinger. 538 pages octavo, 3 maps. Price 10 fr.

Colonel Secretan is, or was, commandant of the 4th Infantry Brigade of the Swiss Army. He has carefully collated all available information and produced a work which "L'Avenir Militaire" considers both able and *à propos*—partly, perhaps, because that paper has always been a violent opponent of M. de Freycinet.

It should prove of special value to candidates for the next Staff College entrance examination.

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LIEUT.-GENERAL SIR EVELYN WOOD, V.C., G.C.B., G.C.M.G., Quartermaster-General of the Forces, in the Chair.

LESSONS FROM THE PAST FOR THE PRESENT.

By Lieut.-Colonel HENDERSON.

It is scarcely necessary, I think, for a lecturer at the Royal United Service Institution to dilate on the advantages of the study of military history. As there are none here who are not familiar with Napoleon's maxim, "Read and re-read the campaigns of the great captains; this is the only way of rightly learning the art of war," so there are none here who will dispute the soundness of the opinion of the greatest captain of them all.

But although every soldier who takes his profession seriously admits that there is much to be learned from the experience of others, especially when these others were far greater men than he is himself, I think that the extent and nature of the knowledge to be acquired from a study of military history are not always recognised.

In the first place, this study, in my opinion, is far too restricted. It is true that ever since war became a science, since battles ceased to be mere gladiatorial combats, and since campaigns have been won rather by the intellect of the commander than the skill at arms of the men, military history has been considered as a valuable means of war training. But I venture to think, however, that this means of training has not only by no means reached its full development, but that it has stopped short at the very point at which it was beginning to be really useful.

It will probably be said that to England, at all events, this assertion can scarcely be applied, that there, at least, the theoretical

education of the soldier has reached its limit. I grant you that appearances are in favour of this view. Our text-books are all based upon the experiences of the past, and when we recall the frequent illustrations, furnished by innumerable campaigns, which add such weight to the deductions drawn by Home and Clery, we cannot but admit that the essence of military history, so far as regards Minor Tactics, has been by them most ably extracted. Sir Edward Hamley, again, did the same for Strategy; and it is unnecessary to expatiate in this place on the ability with which he dissected the manœuvres of the acknowledged masters of the art of war. Nor is this all. The very list of lectures delivered in this theatre, as well as in kindred institutions, is sufficient in itself to prove that the study of military history has attracted for many years the very greatest interest; whilst in our official publications—the infantry, cavalry, and artillery drill-books—those sections which are devoted to tactics are inspired throughout by the actual experiences of the battlefield. There is no want, moreover, in the English language, of books of another kind to teach us, so far as books can, what war is really like. I do not refer to our regimental histories, for war pictures are too often absent from their pages, but to that long catalogue of memoirs, narratives, and biographies, embracing every climate under heaven, and introducing enemies of every nationality, from the Old Guard of Napoleon to the tribes who hold that far-off country "where three empires meet."

Still, with all this mass of literature at our command, and notwithstanding the interest evinced in the study of military history, I believe that, even with ourselves, this method of fitting men for war is still in process of evolution, and I hope this afternoon to give you some idea of the direction which I think the next steps in this process of evolution ought to take.

I will first of all ask what the lessons are which are taught by Hamley, Home, and Clery, and whether their teaching is not confined within too narrow limits? Do their books, in fact, draw all those lessons from military history which Napoleon referred to when he wrote the words I have just repeated? I do not wish to be misunderstood. I have not the very slightest intention of decrying works to which every educated soldier owes so much. If they are limited in their scope it is because their scope was limited of set purpose; because they were only intended for a certain class of student, and for the inculcation of a certain amount of knowledge. Not one of them aspires to comprehend the whole art of war. They pretend to be no more than introductions to a more extended course of study, no more than elementary treatises on strategy and tactics.

Let us take Home and Clery, as the best known of our tactical manuals. What do they teach? The very title of Colonel Clery's book answers the question, so far as this one work is concerned. It teaches Minor Tactics, and the preface to the first edition declares the limits of its lessons. "The following pages formed originally a course of lectures delivered to sub-lieutenants studying at Sand-

hurst." That is, the book was written for the instruction of officers of the most junior rank, and a reference to the table of contents, comprehensive as that table is, shows that the scope of the book goes no further than the title. It deals with Minor Tactics only; with the elementary knowledge without which it would be difficult to handle troops efficiently either on manœuvres or on service. Nor does Home's Précis, although it appeals to a higher grade of officers than the Sandhurst text-book, it is little, if at all, wider in scope. "It has been prepared," says the original preface, "chiefly to aid officers in the examinations for promotion," and to give the several branches of the Service "knowledge of each other's capabilities."

Nor is the last issue, so admirably edited by Colonel Pratt, a whit more ambitious. "A work of this kind," he says, "has no pretension to be exhaustive."

I shall possibly be met with the enquiry, whether, no matter for whom they were written, Clery and Home are not in all conscience enough for anyone? I can well imagine those of my brother officers who are concerned more directly than I am at present with the training of the troops, with field-days and manœuvres, asking in consternation whether I really propose to increase the burden of theoretical knowledge under which they labour. I can well fancy even the keenest of them being horrified when they hear me assert that the man who has Home, Clery, and the drill-books at his finger ends has yet to learn the most important part of his business. I shall most certainly be told that if such be the case, life is not long enough, and that superannuation must inevitably intervene.

As a matter of fact, however, the study of Home and Clery, as those authors well understood and took care to explain, is no more than the first step in a most important section of the art of war. That this is not always recognised is due to the fact that the division of tactical science into two parts—Minor Tactics and Grand Tactics—is very generally overlooked. The very phrase "Grand Tactics" looks strange in its English guise, and I cannot help thinking that Colonel Home, when he called his book a Précis of Tactics, instead of a Précis of Minor Tactics, did something towards confusing the minds of his brother officers. This, however, is not a question of importance. But it is of importance that it should be clearly understood that the science of tactics is divided into two parts, and, also, that the difference between Minor and Grand Tactics should be clearly defined. This last is difficult, for in many respects the two branches of tactics overlap; and I must regret that as I can nowhere find, although I have no doubt it exists, an exact definition, I have to ask you to accept one of my own, which I cannot help suspecting will do very little towards establishing the distinction which undoubtedly exists. However, as definitions—even feeble ones—are necessary when it is desirable that lecturer and audience should consider a subject from the same point of view, I may say at once that Minor Tactics include the formation and disposition of the three arms for attack and defence, and concern officers of every rank; whilst Grand Tactics are the art of generalship, include those

stratagems, manœuvres, and devices by which victories are won, and concern only those officers who may find themselves in independent command.

Minor Tactics are more or less mechanical. They may be called the drill movements of the battlefield; they deal principally with material forces, with armament, fire, and formations; and their chief end is the proper combination of the three arms upon the field of battle.

Grand Tactics are far less stereotyped. They are to Minor Tactics what Minor Tactics are to drill, *i.e.*, the method of adapting the power of combination to the requirements of battle; they deal principally with moral factors; and their chief end is the concentration of superior force, moral and physical, at the decisive point.

This is neither the place nor the time to discuss this distinction at greater length. I will only ask anyone who believes that Home and Clery are sufficient in themselves to fit a soldier for independent command against a civilized enemy, whether he is of opinion that the art of Napoleon, Wellington, and Von Moltke is contained within the covers of those unassuming volumes? Whether a man who has mastered those admirable chapters in which they treat of attack and defence, and of combined tactics, possesses all the knowledge—putting aside the question of practice—which a General should possess? Or, again, will a thorough acquaintance with Hamley's "Operations of War" make a strategist of the same type as any one of the three great leaders whose names I have just mentioned?

I have already said that not one of those three books pretends to be anything more than elementary; and I may add that not one of those three distinguished authors has touched, except incidentally, upon the art of generalship.

The methods by which the great Generals bound victory to their colours are scarcely mentioned in the tactical text-books; and in Hamley's "Operations of War" the predominating influence of moral forces, which Napoleon declared was as to the physical as three to one, is alluded to only in a single paragraph. In short, the higher art of generalship, that section of military science to which formations, fire, and fortifications are subordinate, and which is called Grand Tactics, has neither manual nor text-book.

But whilst recognising the imperative necessity, if the three arms are to work in harmony, and the General-in-Chief is to find in his army a weapon which he can use with effect, of the thorough knowledge and constant practice of Minor Tactics, it should never be forgotten that success depends far more on the skill of the General than on the efficiency of the troops. There have been soldiers' battles, it is true, battles like Albuera and Inkermann, where the Generals gave no order, and which were won solely and entirely by the courage and endurance of the officers and men; but soldiers' battles are only exceptionally victories. The truth of Napoleon's saying that in war "it is the man who is wanted and not men" is incontestable; and his own magnificent campaigns of 1796 and 1814 are sufficient in themselves to prove that an able General, although

with far inferior numbers, need never despair of success. Let the converse—that superior numbers, if indifferently commanded, may be utterly defeated and demoralized—be taken to heart, and the supreme importance of good leading, and of thorough training in the art of leading, becomes at once apparent.

I know of no instance more convincing of the truth of this assertion than our great war at the beginning of the century. Of what fine material our armies were made there is no need to speak. But it is a significant fact that during the period of the Peninsula and Waterloo campaigns those magnificent soldiers, when neither Wellington nor his great lieutenants, Hill and Graham, commanded them, were unable to win victories. Pakenham, with a force of those veterans whom Wellington declared could go anywhere and do anything, was decisively defeated by the American Militia at New Orleans. Other veterans were beaten by their own General at Plattsburg. The unfortunate expedition to Walcheren, undertaken in the same year as Corunna, cost the army the lives of thousands without a single success to compensate; in the same year 5,000 English soldiers were turned out of Egypt by the Turks; and the campaign in Holland of 1814, although conducted by Lord Lynedoch, was not fortunate. It is a melancholy fact that throughout the great war the army suffered in its leaders. We may recall the Duke's scathing observations to the Military Secretary:—

"When I reflect upon the character and attainments of some of the General officers of this army, and consider that these are the persons on whom I am to rely to lead columns against the French Generals, and who are to carry my instructions into execution, I tremble; and, as Lord Chesterfield said of the Generals of his day, 'I only hope that when the enemy reads the list of their names he trembles as I do.' And —— will be a nice addition to the list! However, I pray God and the Horse Guards to deliver me from General —— and Colonel ——."

I fear that I am wearying you with truisms; but in the present condition of tactical study it seems to me that it is scarcely out of place to emphasize the momentous issues that hang on the higher leading. This study, as I have already suggested, suffers for want of expansion. It has been restricted to Minor Tactics, and Grand Tactics, the Art of Command, if it has not been forgotten altogether, has been very generally overlooked. Yet it is to Grand Tactics that Napoleon referred when he said, "Read and re-read the campaigns of the great captains." He was not thinking of Minor Tactics, of formations, of fire, and of the combination of the three arms, for he added the list of the campaigns which he considered useful. And what were they? They were not alone the campaigns in which the troops had been armed with the weapons then in use. They were not his own campaigns, or those of the Archduke Charles, or those of Wellington; but they were campaigns in which the battles were fought out with swords and spears, with slings and arrows, in which the infantry wore armour, and the cavalry used no reins; they were the cam-

paigns of Alexander, Hannibal, and Cæsar, as well as those of Gustavus Adolphus and Turenne.

I cannot believe that he thought there were lessons in Minor Tactics to be drawn from the battles of Cannæ or Arbela, or that the formations of the legion and the phalanx could be advantageously imitated against the musket and the cannon, or that the combination of slingers and archers with swordsmen and spearmen could have anything in common with the co-operation of infantry and artillery. It was, on the contrary, the Art of Command he had in mind when he penned his advice; the stratagems of Hannibal, the manœuvres of Alexander, Cæsar's utilization of moral forces, and the strategic marches of Turenne. His meaning, however, has not been always rightly interpreted; it is not generally understood; and it is, perhaps, for this reason, that the study of military history is very largely confined to the study of Minor Tactics.

I must again say a few words to prevent misunderstanding. My remarks are by no means intended to apply to everyone. I have not the very slightest intention of claiming to be first to explain the true meaning of Napoleon's advice. The list of recent publications and forthcoming articles would in itself be sufficient to prove that there are many students of Grand Tactics amongst English officers. We have the Commander of the Forces in Ireland attaining the highest literary fame as the biographer of Marlborough, the late Commander-in-Chief in India engaged on the life of Wellington, and the Quarter-master-General recording the achievements of cavalry. Nor is the study, and even the writing, of history a new feature amongst officers of high rank. You may not all of you be aware that we have the very highest authority for both these practices. The Great Duke himself was not only an indefatigable student, but he was also an author. He had been accustomed to study his profession, so he told Sir James Shaw Kennedy, for some hours daily throughout the greater part of his military career, and in one of the volumes of his despatches is to be found a long review of Napoleon's Russian campaign, written in 1825. Moreover, the majority of our military heroes are numbered amongst the students; Wolfe, Sir John Moore, Picton, Craufurd, Sir Charles Napier, and Sir Henry Havelock. But, at the same time, notwithstanding this array of famous names, I believe that regimental officers, as a body, are content with Minor Tactics, with Home and Clery; or, if they go further, with such study of recent campaigns as will enable them to understand what a battle between modern armies means, and to realize the effect of modern fire. With the art of independent command they have little concern, and Napoleon's maxim carries no weight whatever.

I venture to think, however, as all officers may find themselves some day in independent command before the enemy, responsible not only for the lives of their men but for the honour of their country, that lessons in Grand Tactics are amongst the most important that can be drawn for the present from the past.

Unfortunately, the study is difficult and laborious. There are no convenient summaries, like Home and Clery; and without a com-

petent instructor it is no simple matter to extract profit from reading the account of some complicated campaign. There is no guide to tell the student what to look for, or to what points he should direct special attention. To include such summary in a short lecture would be impossible, even if I were capable of making it complete, but as I have brought you so far, it would be scarcely satisfactory if I made no endeavour to point out the lines on which the study of Grand Tactics should proceed.

In the first place, what campaigns should be studied? Now there is an impression abroad that it is of little use, at all events for the acquirement of tactical knowledge, in studying campaigns in which breechloaders and rifled guns were not employed, and I think this impression is due in part to an exceedingly interesting lecture which, nearly 20 years ago, was delivered in this theatre on "The Study of Military History by Regimental Officers," by Colonel Lonsdale Hale. In his introductory remarks the lecturer spoke of two officers who proposed to begin the study of military history by reading Napier's "Peninsular War." "As they told me that their object was to become practical soldiers, I not unnaturally said: 'Then, of course, you have read all about the campaign of 1870–71?' No, they had not read much in connection with that war; that is to say, these two officers, in order to become practical soldiers, were about to study the tactics of a period when men fought, so to speak, across a pocket-handkerchief, whereas they they now fight across the mainsail of a man-of-war; of a period when if a man fired at a church steeple he was lucky if his shot fell within the parish, whereas individual men can nowadays be struck by small-arms at 1,000 paces, and artillery boast that troops are not safe from them at upwards of 4,000 yds."

It is evident, however, that Colonel Hale referred merely to Minor Tactics, not to Grand Tactics; and it was because the distinction between the two was not understood by those who heard or read the lecture that the idea arose in their minds that everything which happened before 1870 was obsolete. After what I have said as to the true meaning of Napoleon's advice it is scarcely necessary to say that his advice still holds good, that increase of range and more rapid loading, although they must always be taken into consideration, have affected Grand Tactics to a very small degree. It is to the campaigns of the great masters of war that we must still turn if we would learn the art of generalship, and the campaigns of Marlborough and Wellington are as valuable for this purpose as those of Von Moltke or of Skobeleff.

Perhaps the most useful lesson to be drawn from the famous campaigns of history concerns the great principle of moral force; and regarding this principle my own experience, both as student and instructor, teaches me that a few words of explanation will not be wasted.

"Moral force," says Napoleon, "is to the physical," that is, to numbers, armament, and training, as "three to one." Clausewitz, the most profound of all writers on war, says that everyone understands what

this moral force is and how it is applied. But Clausewitz was a genius, and geniuses and clever men have a distressing habit of assuming that everyone understands what is perfectly clear to themselves. They often forget that they are speaking to or writing for men of average intelligence, who do not reflect deeply, and have to be told important truths instead of discovering them for themselves. Referring to my own experience, I am convinced that the young officer of average intelligence but seldom grasps the meaning of Napoleon's maxim. He accepts it, as soldiers accept the words of the greatest soldier of them all, without question. But he gets no further. His text-books repeat the maxim, but being concerned with Minor Tactics only, they do not discuss it; and there is no treatise, so far as I am aware, which explains what the nature of this moral force is or how it has been utilized in the field. I find nothing more difficult than to drive into men's heads the fact that the great Generals took this moral force into account in all their plans of battles, that the effects they expected from their combinations were based upon moral considerations, and that it was because of this that we call them "great." To those young officers, therefore, who find themselves in the same predicament as I certainly was once myself—accepting the maxim without in the least understanding it—I venture to add a few words which may enlighten them.

Such enlightenment may prove of no immediate benefit whilst they hold their present rank. But no General, no commander of an independent force, can hope for great and decisive success without grasping Napoleon's meaning so thoroughly that he is always trying to express it in action; and the sooner officers gain this knowledge the more familiar will it become—the more likely to be utilized when their time for command arrives. Moreover, when they read of war, when they hear of war, or when they criticise Generals and operations, as young officers sometimes do, they will see things from a new point of view, listen to them with a more intelligent interest, and perhaps be more judicious in the way in which they apportion praise or blame.

The first thing is to realize that in war we have to do not so much with numbers, arms, and manœuvres, as with human nature.

What did Napoleon find in the history of the campaigns of Alexander, Hannibal, and Julius Cæsar? Not merely a record of marches and manœuvres, of the use of entrenchments, or of the general principles of attack and defence. This is the mechanical part—the elementary part—of the science of command.

No; he found in those campaigns a complete study of human nature under the conditions that exist in war; human nature affected by discipline, by fear, by the need of food, by want of confidence, by over-confidence, by the weight of responsibility, by political interests, by patriotism, by distrust, and many other things. The lessons he learned from the campaigns he studied so carefully were not mechanical movements and stereotyped combinations. He was not merely an imitator. Not one of his campaigns has its exact prototype in history—but he learned from history the immense value of the moral element in war; to utilize it to the utmost became instinctive,

and he played upon the hearts of his enemies and of his own men with a skill which has never been surpassed.

Now, in the long history of war we find a number of Generals who were good soldiers, men who understood the mechanical part of their business, who could maintain discipline, who could organize, who could handle their troops carefully in attack, who had a good eye for country, and who could selectand occupy strong defensive positions, and yet, although they escape the reproach of being bad Generals, no one ever calls them "great." Read through their campaigns and you will find it hard to point to occasions where they actually broke the ordinary rules of war; you will certainly never find occasions where they ran unnecessary risks. Now, turn to the campaigns of the great Generals, and you will find the rules of war violated again and again, until you get into a hopeless confusion as to what the real rules of war are; you will find them conducting operations which, if they were not the enterprises of a lunatic, were apparently full of risk, and you find it an easy matter to point out some easy manœuvre or simple precaution on the enemy's part which would have ruined the whole operation. But the curious fact is this, that the operations very seldom did fail, and that, if they did, it was not because the rules of war were set at defiance, but because of some fault in execution.

The explanation of the brilliant successes that the great Generals gained in spite of rules and against enormous risks is to be found in the fact that they looked not only on the physical side—on the numbers and armament of the enemy—but that they saw his weaknesses; they played upon his susceptibilities and apprehensions; every movement that they made was calculated to destroy the moral and confidence of both General and soldiers; if they made movements which set at defiance the rules of war, it was because they were aware that the moral influence of such movements made them absolutely safe; and if in appearance great risks were run, it was with the full knowledge that the enemy's character or his apprehensions would prevent him from taking those simple precautions by which the critics point out that the whole enterprise might easily have been ruined. "They had penetrated," to use a phrase of the late Colonel Charles Brackenbury, "their adversary's brain."

These considerations are often overlooked by those who know little of war. In order to explain satisfactorily the causes of success which they are unable, from their lack of knowledge, to comprehend, they put the whole thing down to chance, and brand the commander with the epithet of lucky. Now, that there are lucky Generals it is impossible to deny; but the epithet is more appropriately applied to those who commit flagrant mistakes and get off scot-free, because they have to do with an incapable antagonist. To call Generals who are invariably successful "lucky," is as much as to say that there is no such thing as skill in generalship, or no such quality as aptitude for war. You may call them "unlucky," if you will, when their plans are ruined by some incapable subordinate; but when you try to find a reason for their long roll of successful cam-

paigns and cannot do so, consider whether it is not possible that what you call "luck" is the result of profound calculation, of a grasp of the situation far wider than your own, and of a utilization of moral force which even special correspondents do not always understand, and which the official despatches do not reveal.

The ordinary General, on the other hand, even if he takes into account the peculiar characteristics of the enemy, does not, like the great Generals, take into account the character of the hostile commander; and he runs none of those apparent risks which bring about decisive victories, because he neither understands his opponent's weaknesses, nor the art of turning them to his own advantage. He does not set mind against mind; and yet war is more of a struggle between two human intelligences than between two masses of armed men. The great General, whilst raising to the utmost the moral of his own men, reckoning up that of the enemy, and lowering it in every possible way, does not give his first attention to these points, nor to the numbers against him. He looks beyond them, beyond his own troops, and across the enemy's lines, until he comes to the quarters occupied by the enemy's leader, and then he puts himself in that leader's place, and with that leader's eyes and mind he looks at the situation; he realizes his weaknesses, the points for the security of which he is most apprehensive; he considers what his enemy's action will be if he is attacked here or threatened there, and he sees for himself, looking at things with his enemy's eyes, whether or no apparent risks are not absolutely safe. If he knows something of his opponent's personal character he has a powerful weapon put into his hand. "It is to be ignorant and blind," wrote the Grecian biographer of Hannibal, "in the science of commanding armies, to think that a General has anything more important to do than to apply himself to learning the inclinations and character of his adversary," and to Hannibal's observance of this maxim he ascribes the extraordinary victories of the great Carthaginian. Look at Napoleon. When his luggage was captured during the retreat from Moscow, Sir Robert Wilson, the English Commissioner with the Russians, relates that there were found amongst his private papers biographies of all the Russian Generals opposed to him. In the Waterloo Campaign again, his first move, when he found himself in a position to attack the Allies in detail, was to strike at the Prussians, knowing that Blucher, impetuous fighter as he was, would never decline a battle in order to fall back and combine with his more cautious ally. Look at Wellington. It is Napier who tells the story. When the British army was in the Pyrenees, entangled in very difficult country, very skilfully defended by the French, the Duke on one occasion ordered a hazardous movement. As soon as he had done so, he rode up to the outposts to observe the French for himself, and the men cheered him all along the line. The French commander, Marshal Soult, surrounded by his staff, was on the opposite hill, and Wellington observed their uneasiness at hearing the cheers across the valley. "Soult," he said, "is a very cautious commander. He will delay his attack to find out what these

cheers mean; that will give time for the 6th Division to arrive and I shall beat him." It turned out exactly as he anticipated.

Again, let us go across the Atlantic. The Great Civil War in America was fought out by Generals who were, some of them, in the first rank, for the respect they paid to the moral aspect of war was remarkable. The greatest of all was Lee, and his Military Secretary writes as follows: "He studied his adversary, knew his peculiarities, and adapted himself to them. His own methods no one could foresee; he varied them with every change in the commanders opposed to him. He had one method with McClellan, another with Pope, another with Hooker, and yet another with Grant. But for a knowledge of his own resources, of the field, and of the adversary, some of his movements might have been rash. As it was, they were wisely bold."

The next point I would refer to is stratagem; and on this I think it is hardly necessary to dilate at length. It is not difficult to understand the importance of deceiving and bewildering your opponent; to realize the force of Stonewall Jackson's advice, "Always mystify, mislead, and surprise the enemy." Surprise is the greatest of all foes; by stratagem surprise is made possible, and stratagems have been used since the night when the army of the Midianites, "like a multitude of beasts, with camels innumerable as the sands of the sea-shore," fled before "the trumpets and the empty pitchers, and the lamps within the pitchers," of Gideon's 300 men. Had Lord Wolseley completed his biography of Marlborough, there would be no occasion to remind English officers that the greatest of English soldiers was only equalled as a master of stratagem by Hannibal and Napoleon. If upon this account alone, the story of his campaigns is in the highest degree instructive, and we may trust it will not be long before English soldiers are as familiar with his methods of war as with those of Wellington.

Lastly there is the use of ground. You may perhaps be disinclined to agree with me when I say that instruction as to use of ground may be gathered from books. I do not for a moment wish to assert that any amount of reading will compensate for the study of ground on the ground itself. But I am still of opinion that there is very much to be learnt in this respect from great campaigns, and that the value and scope of the practical study can be very largely enhanced by theoretical knowledge.

On this question of ground the text-books of Minor Tactics give us some assistance. For instance, it is one of the most valuable characteristics of Clery that the capabilities and influence of the ground are alluded to in every chapter. But, as the book is little concerned with generalship, there are few allusions as to the manner in which Napoleon or Wellington made use of natural features; there are no illustrations of their methods, and, indeed, if the subject were treated thoroughly from the point of view of Grand Tactics, a larger volume than Clery would be the result. On this point Hamley is admirable, and his chapters on topographical obstacles, and the use to which they may be put, form an excellent introduction to the study of this question from a strategical point of view. But he considers it

from this point of view alone, and so, as regards Grand Tactics, we must go to the campaigns of the great captains, follow their manœuvres on the best maps we can procure, learn with them to recognise the weak points of a position, to utilize the cover which the country affords in order to mass unexpectedly against some one of those points, and to derive that advantage from natural features which has so often outweighed the advantages of numbers.

I may here anticipate the objection that increased range of fire-arms has altered everything. This increase, as I have already remarked, must always be taken into consideration, and there can be no doubt that the power of modern fire has made ground which was formerly eminently favourable for attack eminently favourable for defence; and, also, that as regards defensive positions, the necessity of great depth of cover for supports and reserves, and for second and third lines from the far-reaching shrapnel has changed the conditions under which troops are distributed. But, in reply to the objection, I assert that *general principles*, so far as Grand Tactics are concerned, still hold good. For instance, if we select a defensive position Wellington's dispositions under such circumstances are no bad guide. Not only may we notice his use of advanced posts, but the position of his second and third lines are well worth consideration, and how it was they were always at the right place at the right time. If we are inferior in artillery—as he generally was—is it not useful to consider his occupation of a position under the same conditions—the skirmishers half way down the slope, drawing the enemy on, whilst the main line was hidden behind the crest at such distance as prevented the enemy, when his columns reached the height, from bringing up his guns to support his infantry?

Again, in the attack; look at the extraordinary profit to which Napoleon turned those natural obstacles perpendicular to the line of battle at Rivoli, at Friedland, and at Dresden; at the value in a counterstroke of such tactical points of the village and the knoll which formed the centre of the Allied position at Austerlitz. Look at the almost precipitous slopes—as steep as and far higher than the famous Rotheberg at Spicheren, up which he led two army corps during the night which preceded the surprise and victory of Jena! Look at Lee, in the great campaign of 1864, where he allowed an army, double his numbers, to turn his flank, enticing his adversary into the jungle which is called the "Wilderness of Virginia"—a jungle of which his men knew every path, and of which the Federals knew nothing—in order that he might overwhelm their unwieldy masses.

I am tempted here to give a very brief description of Austerlitz. It was the most brilliant, because the most skilful, of Napoleon's victories—and as the result of a combination of the application of moral factors—of stratagem, and the use of ground, affords a most forcible and complete illustration of the art of Grand Tactics.

In November, 1806, Napoleon was encamped with his Army east of Brünn, in Moravia, with his line of communications running southward to Vienna. At Olmütz a Russian and Austrian Army was slowly assembling. Another Austrian Army was in Hungary, and it was

probable that Prussia might declare war. Napoleon pretended to enter into negotiations, and on the Allied Army moving forward from Olmütz, he permitted it to capture an advanced detachment.

His inactivity before Brünn—so different from his usual rapid offensive—his apparent desire for peace, and his permitting his detachment to be captured without an effort to support it, led the Allied Generals to believe that he feared a battle, and would retreat on their approach in the direction of Vienna. As he had anticipated, whilst continuing their forward movement they threw forward their left, with the evident design of cutting him off from his base of operations. On the 1st of December they arrived opposite the French position, and the tendency to turn the enemy's right was still more manifest.

The ground on which the battle was fought is an undulating plain—lying between two parallel chains of mountains, which run east and west at a distance of some 10 or 12 miles. Napoleon had taken up a position behind a brook, where the ground gave some cover, with his left flank almost touching the northern of the two ranges, and with a great gap between his right and the southern range. Through this gap—several miles in width—it seemed easy to penetrate, to turn his flank, and block his communications. The Allies fell into the trap. The very line of their bivouac fires, blazing on the opposite ridge the night before the battle, revealed to their astute antagonist the movement projected for the morrow and, in a proclamation to his soldiers, he not only told them what the enemy would try to do, but explained the manœuvre by which he should win the battle.

This manœuvre was as follows:—

The Allies were posted on a long bare ridge, of which the culminating point was a commanding hill, with a little village half-way up the slope. Napoleon determined to attack their right vigorously, to permit their left wing to get well away on its great outflanking manœuvre, and then, with 30,000 men—in one huge mass—to attack their weak centre, to seize the village and the hill, and by the occupation of this strong tactical point, the value of which his trained eye for ground had detected, to cut their army in two.

In order, moreover, to draw the turning movement on, he showed only very few troops on the threatened flank, the division with which he designed to hold the outflanking attack being encamped during the night several miles distant from the field of battle.

His anticipations were fulfilled to the letter. The result of his extraordinary combinations was the destruction of nearly half the opposing army, and when the original equality of force is considered, it must be allowed that the genius of a great General has seldom been more effectively displayed.

Time forbids me to quote further illustrations, and it is possible that some few may be still unconvinced. But even if you do not admit that the principles on which Wellington and Napoleon acted are applicable to modern conditions, you will at least allow that an intelligent study of their battles will emphasize the importance of ground, and will induce the student not only to appreciate the im-

portance of topographical features at their true value, but to try and acquire that eye for country which is a distinguishing characteristic of every great General.

These are only some of the elements of Grand Tactics to which I might refer, but I must be content with having brought to your notice the more important. I should not like to conclude, however, without showing you that the study of the art of command need not necessarily entail a great amount of reading. On this point I may quote some remarks made by Lord Wolseley, at a lecture in Dublin, not very long ago.

"A certain amount of reading," he said, "and a certain amount of study is absolutely necessary for any man who ever wishes to command troops in the field; and," he added, "so far as I know of the study of war, the great thing is to read a little and think a great deal—and think of it over and over again." I don't think that this advice can be bettered. A few campaigns thoroughly studied will do more to strengthen the intellect, to develop a capacity for hard thinking and to teach the art of leading troops, than fifty campaigns that have been merely skimmed. General knowledge is often superficial. There is no great benefit, for instance, to be derived from reading the whole of Napier or the history of Napoleon, but it would be great benefit if, in the course of a single winter, an officer were to work out and think out the campaign of 1796 in Italy, or the campaign of 1812 in Spain. When I say "work out and think out," I do not imply that he should be content with reading the narrative and the criticisms, and with following the operations on the map. By far the most useful way of studying military history is to find out from your books, so far as possible, what the situation was at any given time; then to shut the books, take the map, decide for yourself what you would have done had you been in the place of one of the commanding Generals, and write your orders. You are thus dealing with a problem which actually occurred; and in working out the solution you are training your judgment—and remember that war presents a constant series of problems to every officer who may hold an independent command. If an officer has been accustomed to deal with military problems—even on paper—the powers of his mind and his natural ability will have been strengthened in the right direction, and the process of reasoning, which the solution of difficulties involves, will come easier to him than to the man who has to depend in all the excitement of battle on a rusty intellect and the chance of a happy inspiration. I may remind you that if there was one quality more than another in which the great captains excelled, it was their power of reasoning. The despatches of Napoleon, of Wellington, and of Von Moltke prove that they depended for success on their hard thinking and careful calculation. In fact, those magnificent strokes of genius which seemed dictated by the circumstances of the moment were due, as Napoleon himself implies, to a habit of calculation so rapid and so accurate as to seem to the uninitiated like inspiration.

"If," he said, "I always appear prepared, it is because before

entering on an undertaking I have meditated for long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I have to do in circumstances unexpected by other people; it is reflection, it is meditation."

Nor do I think that for the purpose of learning how to handle a small force of the three arms it is necessary to study a whole campaign. Such a study has the advantage of teaching strategy and tactics at one and the same time, and it is certainly a very thorough means of education. But it is by no means a bad thing if education proceeds by successive stages, and it is well to learn how to handle a small force on the field of battle before we aspire to manœuvre an army on the theatre of war.

I would advocate the study of a few famous battles, fought by able leaders. Take, for instance, such a series of English victories as the following:—Vimiera, Roliça, Sabugal, Redinha, Maida, Alexandria, Almaraz, Barossa Here is a list of actions fought by comparatively small forces, in all of which skilful generalship was displayed. No one can object that they are either dull reading, or would occupy too much time, and all of them will afford many suggestions as to stratagems, manœuvres, the art of concentrating superior force, and the occupation of positions. It does not appear to me too much to ask the British officer of to-day to follow the example of Wellington, Wolfe, Moore, and Napier, and the course of study I suggest is not a very lengthy one. The first thing to do is to learn the tactical sections of the three drill-books thoroughly—if not by heart. There the concentrated essence of modern fighting is to be found, based on the experience of many wars, and I must say that I think it absolutely useless for any officer to study military history until he has the rules, maxims, and principles contained in the official manuals at his fingers' ends. Then, to elucidate points which are necessarily much condensed in the drill-books, read some manual on Minor Tactics. A single battle of the 1870 era will give you an idea of what a modern battlefield is like. Certain chapters in Mayne's "Fire Tactics" are invaluable. When you have done this, set to work at Grand Tactics, study the battles of Napoleon, or of Wellington, or of Marlborough, sleep with "The Soldier's Pocket-Book" under your pillow, and, so far as theory can help you, you will have done your duty.

If I were to put my finger on the most important "Lesson that may be drawn from the Past," I should reply that history teaches us that courage, numbers, armament, and entrenchments are of no avail if the troops are badly led, and that the honour and safety of the Empire depend on the skill and knowledge of British officers.

It is true that theory by itself will avail but little. When he was asked the best means of learning the art of war, Lord Seaton, the famous Colonel Colborne of the Peninsula and Waterloo, replied, "Fighting, and a d—d deal of it." But practical experience, at all events of civilised warfare, falls to the lot of few, and practical experience, unless it forms a basis for reflection, and is amplified by comparison with the experience of others, loses half its value.

Frederick the Great, you may remember, in speaking of officers

who relied on their practical experience alone, caustically remarked that there were in the army two commissariat mules which had served through twenty campaigns, "but," he added significantly, "they are mules still." To draw all the good out of practical experience, reflection and comparison are necessary; but reflection and comparison will be impossible unless the brain has been trained to think, and the mind is stored with knowledge of the past. Moreover, as regards Grand Tactics and the art of independent command, our experience as junior and subordinate officers is little to the point. It is rare indeed that an officer progresses gradually from the control of a small independent force to the control of a large one. As a very general rule his first experience of independent command is the charge of important operations. He rises suddenly from the position of a subordinate, obeying orders, and concerned only with the execution of a plan devised by another, to the vast responsibilities which attend the functions of a General-in-Chief, and, under the burden of those responsibilities, in order to bring his operations to a successful issue, he must rely on his natural aptitude for war, on his moral courage, and his theoretical knowledge of the art of command. Theory, applied to the profession of arms, is to some a word of most obnoxious sound. But it is obnoxious only to those who refuse to listen to the advice, or to take warning from the practice of Napoleon, of Wellington, and of many of our own most famous Generals. "It is not pretended," says M'Dougall, "that study will make a dull man brilliant, nor confer resolution and rapid decision on one who is timid and irresolute by nature; but the quick, the resolute, the daring, deciding and acting rapidly, as is their nature, will be all the more likely to decide and act correctly in proportion as they have studied the art they are called upon to practise."

The following advice was written to a young officer by Sir Charles Napier, himself an example of the highest military genius, who not only did not disdain incessant study of his profession, but thought it indispensable to success: "By reading you will be distinguished; without it, abilities are of little use. A man cannot learn his profession without constant study to prepare especially for the higher ranks. When in a post of responsibility, he has no time to read; and if he comes to such a post with an empty skull, it is then too late to fill it. Thus many people fail to distinguish themselves, and say they are unfortunate, which is untrue; their own previous idleness unfitted them to profit by fortune."

In a time of peace like the present, when there is nothing to attract the minds of soldiers from the ordinary routine of their profession, and especially in a time when the chances of England becoming involved in a great war are considered as remote as they were in the era which preceded the Crimea and the Mutiny, there is a danger that the ordinary routine may be considered as sufficient for every purpose. Our distinguished visitor, Captain Mahan, has pointed out that the cordial reception which his books on the Sea Power have met with in England is virtually an admission that the systematic study of "The Conduct of War," has been to some

degree overlooked by English sailors. The real reason of this enthusiasm, I believe, is rather that a most brilliant intellect has thrown new light upon the lessons of the past. But, be this as it may, we soldiers may take warning from our comrades of the Navy. It is true that in some respects we have been more fortunate than they, for we have been long provided with capable teachers. The Memoirs of Napoleon, the Despatches of Wellington, Napier's History of the Peninsular War, to take but a few amongst many, are as instinct with genius as even the works of Captain Mahan. We have only to ask ourselves whether these volumes are studied as they should be, and whether our younger officers realise the importance, and understand the methods, of preparing themselves for the responsibilities of command.

In conclusion, if I were asked to put my finger on the most important lesson that may be drawn from the past, I should reply that history teaches us that courage, numbers, armament, are of no avail if troops are not well led; and that, although our rank and file, when compared with the troops of any nation whatever, still maintain their superiority, the honour and safety of the Empire depend on the skill and knowledge of English officers.

The CHAIRMAN: I should be glad if any of those gentlemen who are about to take part in the discussion will be good enough to tell us—if they agree, as probably many will substantially agree, with what the lecturer has been advocating, viz., the increase of the conscientious study of military history—whether his definition is likely to help the young officer in giving him one more definition, which he proposes to call "grand tactics." I hope somebody will be good enough to say whether he thinks that that is a good definition to adopt, because it is something new. I have here before me a book in which tactics are described by Napoleon as "the art of being stronger." The point I would like some of you to elucidate is whether the adoption of these words "grand tactics," of which the lecturer himself has told us he has only mentioned some branches, is likely to facilitate the study of our younger comrades.

Brigadier-General GOSSET: I do not feel prepared to state whether the definition given by Colonel Henderson in his excellent lecture is the most suitable to be found. What I would point out is that the lecture is valuable, inasmuch as Colonel Henderson has, as Sir Evelyn Wood says, brought forward a new subject, or rather put before us an old subject in a new light, and very forcibly. I always considered it was a great pity when, some years ago, the study of military history was withdrawn from the course at the Royal Military College, and it is a source of satisfaction to think that it has now been re-introduced. But what I wish to point out is, I think our duty in teaching the young officers of the army lies more in leading them to the knowledge of what to read and how to study. My experience as an instructor at Sandhurst and commanding officer of a battalion has shown me that it is not so much a disinclination to study which exists in the army among our officers as the want of being put on the proper road, and in my attempts to lead officers to study, I found that most of them were, as a rule, ready to back me up. With regard to the Royal Military College at Sandhurst, as you know, minor tactics have very wisely been taught there for some years, and now that the subject of military history in general, which includes what the lecturer calls, for want of a better definition, "grand tactics," has since been re-introduced. I consider instead of having, as they have now as I understand, each instructor and professor in tactics lecturing upon military history and the higher tactics, it would be far better to revert to the system of a special lecturer for this subject, and in saying this I would recall to the memory of those who sat under them in old days, Colonel Charles Chesney, Adams, and others, and the value of their work as

lecturers. There are very few men who can lecture well and clearly, and anyone who has been at the College, or has tried it himself, will know that if you want to impress young men, to really give them an interest in their profession and make them study, you must have somebody who, like our friend Colonel Henderson, can put the subject well and in an interesting way before them. Otherwise, like a bad sermon, instead of rousing the congregation it sends them to sleep. Therefore I hope that a lecturer will be appointed to Sandhurst for this very important subject. Another thing I wish to bring forward, with reference to the study of tactics generally, is, although I may be somewhat advanced in my ideas, that the regiment should be a school for instruction. We have now our Royal Military College, where the young officer learns a certain amount of theoretical tactics. He goes to his regiment, and is put through his drill and field training, and it is carried out well in many regiments, while in others it is worked in rather a perfunctory manner. If he happens to get into a regiment where this perfunctory work is done he learns very little, and any desire he has to learn at the most receptive period of his career is starved for want of encouragement. I maintain that the regiment should be the school for the army. It is one of those subjects which I brought forward in a lecture I had the honour of giving here three years ago, and I think, although my ideas may not be those of many officers, it is rather a slur on the British Army that we should be obliged to go to garrison instructors to enable our officers to pass their examinations for promotion; and I go further, and say that the new orders with reference to the examination of majors for command of regiments will, I am pretty certain, oblige a great many of them to go to the gentlemen who prepare officers for the army, in order to obtain the knowledge which they cannot get apparently in any other way. I was struck last year, at some of the manœuvres held by me in Burmah, by a remark made by a major of over 20 years' service, to whom I gave command of a mixed force. He did very well, but after the manœuvres he came up to me and he said, "I wish to point out to you, sir, that this is the first time in the whole of my service that I have had anything like a scheme given me to do in the field." I said, "How is that?" He replied, "The reason of it is that my regiment is one which has always been in stations where we had no other troops, and I never had any chance of putting my theory into practice." I would say, in defence of the British officer, that this is not altogether an uncommon case. We often lose sight of the fact that our army is scattered all over the world, and that it is often very difficult for the British officer to study the higher branches of his profession practical'y, in the way we all wish him to do; and you cannot make a comparison between them and the officers of foreign armies for that reason. Of course where there is a will there is a way, and there are many officers who, much to their credit, get out of the difficulty, and who study a good deal: but it is a very hard thing upon officers who are anxious to work and qualify for the higher commands that they should never have a chance, as many of them certainly have not, of putting their theories into practice. If our own regiments become the schools of instruction, we shall then be on the road to prepare our officers from their youth up for the higher commands. The British officers, as a body, are as good, if not superior, to officers of other armies. Their excellent qualities come out in all our small wars. In Burmah, where I have lately been, it is quite remarkable what foresight, pluck, and "nous" has been shown by young officers under very difficult circumstances. If we can only work upon such good material I am certain what the lecturer proposes, whether he calls it "grand tactics" or by any other name, there are plenty of officers who, though they may never become great masters in the art of war, will be led to read and study to their own advantage and that of the Service.

Mr. Spenser Wilkinson: I should propose to offer a remark or two on the question which you, sir, have raised. It seems to me rather unfortunate that in this paper a new definition and a distinction between minor tactics and grand tactics has been introduced. I imagine that Colonel Henderson's purpose is to advocate the adoption in the British Army of the practice of studying by the solution of problems, and its application to the study of military history. I think the distinction he has drawn between minor tactics and grand tactics is likely to have dangerous consequences, because it leads to the impression that you can learn

how to be a captain, or a major, or a colonel without the study of problems, but that when you are going to be a General you must begin them. It appears to me you cannot learn tactics at all merely out of books such as Clery and Shaw, or any of the text books; they give you a number of rules and analyse the nature of the three arms. All you learn from them is certain forms and elementary principles. But the mark of the tactician at any stage is not simply the knowledge of forms, but that power and judgment which enables him to analyse the situation before him and to decide on the measures he will take accordingly. I take it that the method of problems is the best plan of developing the power of grasping a situation. If you are going to distinguish in Colonel Henderson's way between grand tactics and minor tactics it implies that you must not cultivate this power until you are coming to large bodies of troops or to an independent command. But surely the vital point in the cultivation of tactics is in the formation of the judgment in every officer, even in the lowest rank, and in beginning to form it at the very beginning. So I should like to submit a question which others will be ready to answer, whether if we are to have a distinction at all the true definition would not be between formal tactics and applied tactics; between the study of formations and the study of situations. I think officers who try that method—the analysis of situations—will find it much more likely to develop initiative, and enable a man to make up his mind in a crisis, or under any circumstances, than merely studying formal tactics. If Colonel Henderson would be willing to reconsider the definition which he proposes, and to substitute for it another phrase which he used—"the art of command"—and to make the distinction one not of greater or less importance, but one of kind, going through matters both of great and small importance, I think his suggestions would bear greater fruit.

Captain JAMES: I really think the question of definition is a rather unimportant one, and for this reason. It is impossible to draw a hard and fast line where grand tactics—although I should prefer the translation of the words *grande tactique* as higher tactics—it is impossible to draw a hard and fast line where grand tactics cease and minor tactics commence. In the same way strategy shades off into higher tactics also in an imperceptible degree. In fact, I will go further than Colonel Henderson, and accept the fourth definition of the "art of war," which you find in so many of the old books—logistics, the art of moving troops. But whether you adopt these definitions, all or in part, the practical fact arises that the "art of war" is divisible into two main branches of "strategy" and "tactics;" that is to say, "strategy," the movement of troops before collision takes place, and "tactics," the movement of troops when collision is imminent or is actually going on. I am not going to play the part of a captious critic, but I am inclined to differ from Colonel Henderson on what apparently is his view of the value of minor tactics. I would remind you that for one officer that is called upon to solve problems of strategy there are at least a thousand who are concerned with minor tactics; and that for one who is called upon for the higher branch of tactics there are at least 100 called upon for the minor branch. Now, it seems to me it is just this minor branch of tactics that is the most difficult to instruct officers in, and for this reason. The handling of troops under fire is always a difficult problem. It is one in which the moral side is to the physical quite as three to one, if not more. I always remember a remark you made, sir (Sir Evelyn Wood), to me 15 years ago, when you said, "Never judge of the value of a man until you have seen him under fire." That is most just, because you may be a most excellent theoretical tactician in the closet, but you may utterly fail when the bullets are flying about. For the study of minor tactics it seems to me this is just the very thing in which we are most deficient in England. Our regimental histories contain very little record of the actual details of fighting. Numerous books on this subject exist in both German and French, especially German, and I believe, for the regimental officer, the study of these books, which show what actually was done by troops under the strain of battle, is far more valuable and necessary than excursions into the higher walks of the military art. I quite agree with Colonel Henderson that the study of the drill book must come first, but I do not think that would suffice absolutely, and I am inclined to think that anybody who confines his study to the drill books would be occasionally brought up with a round turn. They

do not always agree, which is one thing. I put down two or three little points to-day which I have no doubt are oversights in the compilation of these books, but which really are of importance when you come to definite instruction. I find, for instance, the views of the military and infantry officers put forward in the official book differ with regard to artillery fire. The infantry looks upon 3,000 yds. as the effective distance of artillery fire, and says it is the extreme useful range. The artillery officers, on the other hand, claim effects at greater ranges, for the official artillery text book says that 3,500 yds. is the distance, and that up to the power of vision useful effect may be obtained on many occasions. They differ again on the question of what is the safe range for guns from artillery fire. At 1,200 yds., says the Infantry Drill Book, infantry should make artillery pay very heavily for coming into action. The Artillery Book, on the other hand, says at 1,100 yds. artillery can defend itself against infantry. There is a slight contradiction. Therefore, it seems to me, you must not confine your study either to the drill books or even to the many excellent works on tactics which exist in this language. It seems to me practice alone is the plan by which practical minor tactics can be taught. You must begin by certain principles, no doubt, but you must take care that your practice, your practical teaching of those minor tactics in peace-time, is made as like war as possible, and that the only difference you should have would be that the casualties would not be produced by bullets. Constant practice alone can make a good minor tactician. Would anybody in this room go to a surgeon who said "My system of keeping my knowledge of amputation is to practise it once a year for a month. In the remaining 11 months I do not practise the practical part; I confine myself to making up boluses"? I do not think we should, and if one wanted one's leg cut off we should prefer to go to a man who is doing it every day. If this is necessary in the medical profession I am sure it is quite as necessary in the military profession. I quite admit that there is no book which deals with higher tactics—with what Colonel Henderson has defined as grand tactics; but we must pick out from the records of the past the working of the minds of Commanders-in-Chief on certain occasions. We know what the facts were before them when they had to solve the problem, and we know the solutions they gave to those problems; and by carefully studying these, and bearing in mind actually what was before them when they gave their solutions, we can get a very good idea of what the higher branches of tactics really are. For instance, as the lecturer has stated, we have an excellent example in the battle of Austerlitz; we have a situation very well known of Wellington on the 17th June; we have many good records in the Franco-German War. For instance, take the Le Mans campaign. We have Von der Goltz's account of it, which gives the exact situation, and really what was working in the Commander-in-Chief's mind on many important occasions. Colonel Henderson alluded to our list of disasters. Of course he could have made it much longer, and I venture to say the result is due in many cases to the incompetence of the leaders, and that was largely due to the fact that they were quite uneducated soldiers, and that there was in those days no supervising power whose duty it was to distinguish between capacity and incapacity, and to eliminate the latter from the practical conduct of the operations of the war. As Wellington himself says about his Staff in 1815, everybody knows in that particular year he had foisted upon him a large number of incapable men, and bitterly indignant he was at it. It was not his fault. The belief is certainly not wholly eradicated that these things right themselves when you come to actual fighting, and so they do, but they right themselves at the expense of the lives of the men who are led by these incompetent people. A genius may turn up sometimes at the right moment, and, thank God, he sometimes does, but sometimes he does not, and then disaster follows. We have a great many events in our records which show when the genius did turn up, but we have certainly, even in modern times, had occasions when the genius did not turn up. Anybody who has read the history of the Indian Mutiny knows at the beginning of that the hideous mistakes made by men in high positions of command, to which very largely the extent of the Mutiny was subsequently due. Now, the art of Generalship, of course, can only be acquired by a man who has a natural taste for war, but although by training you cannot make a genius, still it is quite possible to teach mediocrity, and I venture to say the great reason for the

enormous success of the Prussian Army as a military machine has been owing to the fact that they have thoroughly grasped the idea that you can train the average ordinary mediocre individual to do a great deal which he cannot do if he is not trained. It is impossible, of course, to dissect and lay before the student the intellectual workings of the great commander's mind. You cannot say what special mental quality it was that differentiated, for instance, Napoleon from Radetsky, or Wellington from Soult; but this you can do, you can study the methods each employed and deduce from that yourself why Napoleon and Wellington were military geniuses and why Radetsky and Soult were merely painstaking commanders. Strategy, to which the lecturer has briefly alluded, is certainly one of the branches of war which requires to be studied under the changed conditions of modern existence, and it is very little good studying old campaigns unless you do so, for the physical conditions of Europe have been enormously altered during the last 30 years.

Lieut.-Colonel E. GUNTER: We are very fortunate in having an officer of the reputation of Colonel Henderson to lecture here to-day, and his lecture has borne out his reputation. I am very glad to hear him recommend the study of military history at the Royal Military College. Until Colonel Gosset spoke I was unaware that this study had actually been re-introduced. As I see the Professor of Tactics at that College is present, perhaps he will kindly give us some definite information on the subject. I think it absolutely necessary that the study of tactics should be preceded by a short course of military history and geography, and I hope the lecturer will use his influence to bring about its introduction, not only for cadets but for officers entering the army through the militia. We who are instructors find the ignorance of officers astonishing. You have doubtless heard the well known story of how, after an instructor had been explaining to a certain number of young officers what Napoleon did on this and that occasion, one of them said gently, "Please, sir, who was Napoleon?" I cannot vouch for the truth of the story, and can hardly believe it, but that it was told is an indication of the prevailing ignorance. As the lecturer said, in the latter part of his lecture, it is not a large amount of knowledge, which may be merely superficial, that is required, but a thorough tactical study of a few campaigns that is required. I hope that he and other officers will try and get such a course introduced and made a subject of examination, or the study of tactics will not much improve, for without it officers do not understand the allusions made in the Tactical Text Book. If a good book giving *short* accounts of certain campaigns were issued by authority, I think it would be of great assistance. Of course the division of tactics into theoretical tactics and applied tactics is well understood. A speaker who addressed you seems to think applied tactics are not practised by our officers. Any one who has seen the papers set at recent examinations knows that this now forms part of every tactical examination, and some excellent studies in applied tactics have appeared lately. That part of the subject is, it will be seen, attracting much attention in England. But I desire to advocate strongly the re-introduction of a short course of military history as well.

The CHAIRMAN: The lecturer has referred to a certain lecture given by Colonel Lonsdale Hale some years ago, in which he spoke about not going further back than 1870 and 1871 for tactical studies. We should be glad to know what he really meant, because I think the opinion has done harm—that is the reason I refer to it now—in that it stops people reading. It stops young officers reading about the Peninsular battles, and I think really for defensive positions there is almost as much to be learnt from them now as there was at the time the history was written. I think it would do good if he could agree with the lecturer that he only meant it in a modified sense.

Colonel LONSDALE HALE[1]: The lecturer and myself both believe that the really

[1] As both the lecturer and chairman referred to my preference for the study of more recent wars to the study of those of older date, and the chairman expressed a wish that I should make some statement on the matter, I may say that inasmuch as there are found in all campaigns the "eternal principles of strategy," they will

good regimental officer will become a still better officer in the field if he only will delve a little into the military history of the past; but we differ in the methods to be adopted, and we differ also as to the standard which you should set before the British officer. Colonel Henderson places before the British officer a very high standard indeed, and he does so on the ground that unless you put before a man a very high standard, his practice will be very low indeed. I put before the British officer a low standard on the ground that, if you put before him a very high standard indeed, he will look at it, turn back, and say, "That is too high for me, I won't try at all." Colonel Henderson says: "It does not appear to me too much to ask the British officer of to-day to follow the example of Wellington, Wolfe, Moore, and Napier." I think it is a great deal too much to ask the British officer to follow the example of Wellington. The average officer will say, "That man is a giant, I am a mere pigmy. How can I learn history as Wellington did?" It is idle to ask the ordinary British officer to learn history in the same way that Wellington and Napoleon did. Colonel Henderson, at the end of his lecture, asks the average officer to embark on a course of study quite beyond his powers and opportunities. The mistake Colonel Henderson makes is his forgetfulness of the enormous labour required to get any value out of military history; for instance, the one lecture we have heard to-day represents the outcome of 9 or 12 years' study on the part of the lecturer. You, Sir Evelyn, have lately put before the army the achievements of cavalry. They are not lengthy, but how much labour did you spend in the simple getting out of that little result? No one who has not studied military history has any idea what a very small residuum comes out after an enormous amount of labour. You cannot expect the British officer to follow advice entailing all this amount of labour. To do so he must have books at his disposal; he must have access to libraries, and he must have time which he cannot possibly obtain. But still, this knowledge must be given, and means for this study must be furnished to the British officer. I agree with Mr. Spenser Wilkinson that the term "grand tactics" was unfortunate. It does not cover what Colonel Henderson puts under it, for it includes strategy. Then, again, I object to the words "grand tactics" because you are bringing in what I may call a stumbling block and rock of offence in the improvement of the British officer, who will mistake it for an addition to the military curriculum instead of a development only as it really is. What Colonel Henderson wants to put forward is the art of leading troops as distinguished from the mechanical leading. What we want to do is to put before officers not merely the mechanism, but the art of war. The English books we have now give merely the mechanism of war. We want some works which will combine with the mechanism the art also. I respectfully submit that we ought to have that work supplied. We have certain books supplied by the Government, and the Government could not do better than take in hand the production of such a book as I have indicated, a book supplying not merely historical facts, but food for thought on the facts; and as to who shall draw it up, I do not know anyone better than my friend the lecturer.

Colonel HENDERSON said: My attempt at a definition does not evidently meet with favour. "The art of command," however, might include the command of a corporal's guard or of a fire-unit, and it covers more than what I have attempted to define as "Grand Tactics." But, as my friend Captain James has remarked, I think it is a question of small moment. It does not matter what you call the art, so long as officers prepare themselves to practise it. I was much gratified to hear fall from a soldier who has taken such great interest in the higher training of

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be found in recent campaigns, and if a student studies them in these he will pick up at the same time much information of other matters, tactics, transport, supply, &c., which will stand him in good stead in the next campaign he is engaged in; whereas the further back we dive into military history in search of "eternal principles" and grand tactics, the surroundings of obsolete and useless details become more dense and thicker with a corresponding expenditure of labour and time in throwing them out of the way on one side. To study B.C. before A.D. is to put the cart before the horse.—L. A. H.

regimental officers, as General Gosset, the idea that the regiment is the school of instruction. I am by no means desirous of borrowing everything from Germany. In most respects we have very little to learn from our comrades of the Imperial army, and in many respects they have something to learn from us. But there is no doubt that the chief strength of the German Army lies in the thorough efficiency of the officers, and the reason of this high standard of efficiency is because they are instructed regimentally, not only in minor tactics, but in the art of independent command. I have before me a very interesting document, the Report of the Director-General of Military Education in India. As you are aware, of late years, the whole system of military education in India has taken a very practical form; and, with your permission, I will quote a few extracts from Colonel Hart's report. In speaking of the instruction received by the officers before joining their garrison classes, he says:—"In many corps the instruction is most thorough, but there are still some corps in which instruction in 'C and D' is almost entirely neglected or prepared in a most perfunctory manner. . . . . Garrison classes are for two months only, consequently it is absolutely essential for the principal military education of officers to be conducted regimentally. The inefficiency of a junior officer may produce the most serious consequence on service." Referring to the practical exercises, he adds:—"In order that exercises may approach as nearly as possible actual war, it is necessary that officers should acquire a knowledge of modern war by persistent study of military history." Nothing, in my humble opinion, and I am sure in General Gosset's also, could be sounder than those ideas. Colonel Hale seemed to imply that because Wellington and Napoleon were giants, and we are pigmies, that it is perfectly useless for us to study military history like them. I should have thought the fact of our being pigmies would make such study the more necessary.

Colonel HALE: To adopt their methods of studying military history.

Colonel HENDERSON: Because Wellington studied every day I cannot see is any reason why any other soldier, giant or pigmy, should not do exactly the same thing. Colonel Hale has hinted that time is wanting. I thought that argument was "scotched." I scarcely believed that Colonel Hale would be the man to declare that the British regimental officer has not got the time to study like Wellington, Napier, Moore, and many other fighting soldiers. Officers devote time to studying foreign languages or to passing the Staff College, and surely officers who do not go in for these severe tests can spare a little leisure for the study of military history. Besides, it is after all a simple question of duty, if a certain degree of knowledge is necessary for a man to lead his men efficiently and to avoid useless sacrifice of life, it is most assuredly an officer's duty, both to the State and to his men, to acquire that knowledge. We should think very little of a naval officer who said he had no time to spare to learn how to handle his ship in action. Nor does study imply that officers are to become bookworms. I don't advise any one to swallow all the campaigns of Napoleon at one gulp. Military history should be taken in small doses; and one campaign every winter would take very little time, and would broaden the mind in most useful fashion. Two or three pages a day is scarcely too much to ask of anyone; and even a good deal larger dose than this would interfere but little with sport. I don't find the officers at the Staff College are any the worse men across country or in the cricket field because they study, and physically as well as intellectually the good Staff College officers are bad to beat. I have nothing more to add but to thank you, Sir Evelyn, and the audience, for the patience with which you have listened to my lecture.

The CHAIRMAN (Sir Evelyn Wood): I can only touch on perhaps one or two points, because time is going on. Our lecturer said chaffingly in his paper that some people were so clever, so well read, that they provokingly assumed that all who were listening to them were at their own level, but he has put up a very high standard by the list which he gave, and which Colonel Hale criticised, because really if an officer did only a portion of that curriculum he would do very well. We cannot expect a very young officer to look at it from the same point of view that we do, who, I may almost say, are going out of the army. If the officers understood that they were to get something for it, it would be different. Officers read for the Staff College because they think they are going to be employed on the

Staff. In bygone years, no doubt, our Generals, our colonels were not selected for their military knowledge, but for the last few years there has been a greater pressure of selection, and there are now a very large number of officers, more than might be assumed by anyone who did not know the army, who do read. If I want any reference, I see a number of men who will find the reference for me much more quickly, in many cases, than I can myself. I think the lecturer made a little mistake in attributing so much to the General and so little to the troops; that is not the result of my reading. The result of my reading is that the General's skill is mainly shown in giving the first impulse and perhaps the last, but the battle generally is fought out by subordinates, whether there is a Von Moltke directing it or whether there is some one who might have been a failure even 100 years ago. I am glad Mr. Spenser Wilkinson and, I think, Colonel Hale, preferred the "art of command," although the lecturer does not like it. I think it is a better word than "grand tactics." I am in the position almost of appearing to disagree with everything he said, but I do so practically on only one or two very minor points. I ought to explain that, because I am in full accordance with him. I profited, I hope, by going closely through the battle of Spicheren, which he showed was won really in spite of the Generals; and that was also the case in one other of the four great battles of the war, so that I have not quite followed why he put so much on the General and so little on the troops. If I were asked what we ought to try and get the young officer to do, I should say, first of all, to induce him to read. Adam and Chesney were both kind enough to write out for me a statement of how to study a campaign, and they took a great deal of trouble about it. That, I think, we ought to do with our young officers in our regiments. It is Utopian to believe that we can get good instructors in every battalion; indeed, General Gosset, who advocates the battalion being the school of instruction, dwells on the importance of having more good instructors at Sandhurst. But unfortunately they are very difficult to find. We cannot hope to find many good, patient, well-read instructors, and who, knowing the subject, have the power of putting it pleasantly and in a way to attract hearers. Having induced the young officer to read, if you object to the words "art of command," let him study, say, "self-command." When Marlborough was in Council and was invited to attack, and said he would not attack the next day, nothing could induce him, and he was called in the Council Chamber a coward. He said, "Yes, I may be, but I won't attack." He knew that he had somebody alongside of him who meant to pass the news on, and when he did attack the next morning he challenged this officer to lead with him. This is a great instance of self-command. But that is only one quality, and the self-command which I want to impress as my view of what the young officer should aim at is to be a better man than any one under him. I do not mean physically, I mean in work and morally. You may not be superior physically—that is not given to all of us. But I have seen man after man who is not at all clever rise above those around him by force of character. Look at Blucher, look at Lord Clyde: these two men were certainly not clever, they were certainly not well read, but they had force of character. The night before last I was talking to Captain Mahan, and he agreed with me that force of character was a much more valuable possession for the leader of an army or fleet than any amount of technical or naval or military knowledge, and there is no doubt you cannot have that force of character unless you are determined to be, both in work and in character, rather better than all the people underneath you. That is the keynote of your success, and that, I think, we ought to try and impress on our young officers that they should try and be better soldiers all round than those with whom they serve.

Wednesday, June 13, 1894.

H.S.H. PRINCE LOUIS OF BATTENBERG, G.C.B., in the Chair.

THE DIFFERENTIATION OF NAVAL FORCE: A COMPARISON.

By Mr. H. Lawrence Swinburne.

Of all that pertains to the navy, that classification of war-ships which Admiral Colomb has so aptly termed the differentiation of naval force, is probably that least understood by the average layman. To him every large ship is an "ironclad" and every small one a "gunboat" unless it happens to be a "torpedo-boat," in pronouncing on which he generally feels pretty safe. It would also appear as if ignorance on this point was not confined to the general public alone. We constantly come across it in the press, and that, too, in the best informed portion of the press. I have read in a Service paper of a collision between the German "ironclads" "Stein" and "Stosch," in the "Times," of an explosion on the French "gunboat" "Magenta" and the launch of another French gunboat the "Charles Martel," while a popular novelist has moved me to amazement and admiration by his graphic description of a cruiser "fitted with bow-chasers and Gatling guns." From an evening paper, celebrated for always possessing the earliest and most exclusive information, we learn that the keel has been laid of "the 1st class gunboat 'Powerful,' which is a vessel of the 'Majestic' type." Even in the last edition of the "Aide-Mémoire de l'Officier de Marine" I find the "Barfleur," "Centurion," and "Renown" classed as "garde-côtes." It is, indeed, marvellous how often we come across men distinctly above the average in general information, who are either unaware of, or ignore, the fact that for efficiently carrying out those duties, for the performance of which a nation relies upon its navy, not only are ships of varying size, power, and speed required, but that each group of ships has its distinct *raison d'être* and its proper place in any scheme of war operations. As a civilian, I feel as if it were presumption on my part to read a paper on such a subject in this theatre and before this audience, and I am oppressed by the feeling that I am going over ground well known to and often traversed by my hearers. I am, however, emboldened to do so by the hope that my paper may form the basis for such a discussion as will contribute to the information of the general public on this subject. My paper, indeed, is intended merely to bring the subject forward, and this I purpose to do by instituting a comparison between the naval force of this Empire and that of a Franco-Russian alliance, such comparison being preluded by and based upon a system

of classification which shall differentiate ships according to their war value, such value being determined by the nature of the work they are built for, or are only capable of, performing.

Amongst the war-ships of every navy, and more especially that of this country, will be found vessels which, while essential for various peace services, and which might undoubtedly be utilized under certain conditions in time of war, can hardly claim to have a recognised war value. Again, there are others so obsolete in type or construction, or so out of repair, as to be valueless under modern conditions. Such ships can perforce have no definite place in the enumeration of a nation's maritime strength, and even if capable of being utilized, it could only be in subordinate and desultory operations, or as localized guard-ships in conjunction with land defences. In instituting our comparison, we may then commence by eliminating from consideration in our classification:—

1. All ships built only for various peace services and which—though they might mayhap be utilized under certain conditions—cannot claim a distinct and recognised war value; and
2. All ships so obsolete in type or construction, or so out of repair, as to be valueless under the conditions of modern naval warfare.

To weed out those coming under the first category is an easy task, and we can at once eliminate:—

a. All "non-effective" ships such as paddle-ships, yachts, transports, survey-vessels, store-ships, &c.
b. All ships under 2,000 tons in displacement which are incapable of a maximum speed of 16 knots.

With regard to the latter, their doubtful value for war service is easily demonstrated. If they are under 2,000 tons they cannot possess high powers of offence and defence, and hence, if of value, it can only be on account of a speed enabling them to be of use either as scouts or torpedo-boat destroyers. Without this speed their value must only be problematical, and hence speed forms a safe criterion of efficiency with regard to small craft.

With regard, however, to elimination for obsoleteness, the task is by no means so easy, and it requires careful consideration to decide how far obsoleteness, whether in construction, protection, engine power, or armament, tends to lessen the value of a war-ship in relation to the particular purpose for which it was designed, and the sphere of operations in which it is intended to act. These are the four elements which go to constitute efficiency in every war-ship, and if in all a war-ship has attained the highest development as yet attained in her class, she is modern in every sense of the word. It is, however, evident that from this perfection down to absolute obsoleteness in every essential element of efficiency the gradations are many, and as showing this I will take some typical cases from amongst the ships of our own navy. The battle-ship "Alexandra," for example, is constructed of iron, and not of steel, is protected by wrought iron, in lieu

of steel (or steel-faced) armour, and has a main armament composed to a great extent of the obsolete muzzle-loading type. But, on the other hand, she is an excellent sea boat, can keep station with a squadron at 14 or 15 knots speed, has a complete armour belt, carries a powerful armament of its type, and is, in short, a powerful and effective battle-ship. Again, take the cruisers "Iris" and "Mercury," they have no protection and their armament is not quick-firing, but they can claim a powerful breech-loading armament, and a high rate of speed, and are in consequence capable of efficiently performing much of the work that will in war-time devolve upon their class. Again, obsoleteness in one or other respect may render a ship unsuitable for the purpose for which she was originally designed and yet leave her a very efficient factor in some other sphere of war operations. For example, a ship originally designed for the line of battle may be absolutely unfit for such a function under modern conditions, and yet, if she has a light draught and powerful ordnance, be capable of doing effective work as a coast-defence ship, or, if fast and a good sea boat, she may make an excellent cruiser. As typical of the former class I may quote the "Penelope," "Belleisle," and "Orion," and of the latter the broadside ships of the "Minotaur" type. Our process of elimination for obsoleteness cannot then be governed by hard and fast rules, and in regard to this question we must deal with each ship separately and find cause for her exclusion, or retention, as the case may be. If we so base our process we may feel sure that it will exclude no ship which can claim a distinct war value.

Broadly speaking, we have in war-ships four main groups, each having its own distinct *rôle*. To battle-ships we will trust to maintain our supremacy of the sea by blockading the enemy's fleet in its own ports, or by bringing it immediately to action if it attempts to put out to the open sea. They are our first fighting line stationed on the enemy's coast, that is to say, on the frontier of that sea which we claim as our territory. Behind them again are our coast-defence ships, which, to continue a military parallel, we may compare to an artillery reserve. A mobile defence capable of concentration on any given point where attack is threatened by the enemy having broken through, by defeat or evasion, our first line, and so having obtained command of that portion of sea over which such attack can advance. Next come cruisers and scouts, which play two *rôles*. Firstly, they are the division guarding the line of communications, as until the first line is burst through they protect our commerce, and ensure the safety of those trade routes over which it is carried, and by means of which intercommunication between the different parts of the Empire is maintained. Secondly, they are when in the fighting line the cavalry division. They are the eyes and ears of a squadron, the uhlans of the fleet. They keep their army corps in touch with the enemy, they afford a rapid and ready communication between headquarters and outlying detachments, they are on the alert to warn it against contemplated attack. Finally, we have torpedo craft, the outcome of the development of that class of submarine mine which is auto-mobile and capable of use as a projectile. They form a special corps for use

in those operations in which the auto-mobile projectile torpedo is the main factor as a weapon, and though small ships are yet more or less capable of acting independently of a shore base, either alone or in conjunction with other war-ships. Such a classification is, however, by no means precise enough to enable us to draw an accurate comparison between two navies. A much more minute sub-division is yet necessary, and to arrive at such we must consider one by one the main elements which go to constitute efficiency in a war-ship. These, as I have said before, are four in number, viz.,

1. Method of construction.
2. Amount of protection.
3. Power of offence; and
4. Quality of propelling power.

With regard to construction, wood as a material is so hopelessly obsolete that it may be at once dismissed from consideration. As iron has superseded wood, so has steel superseded iron, and for much the same reason, increased strength and lightness. Other things being equal, the steel-built ship is, therefore, of higher efficiency than the one with the iron hull. Again, take protection, which indeed is a part, and a very important part, of construction. Here two points come into consideration.

(*a.*) The nature of the material; and
(*b.*) The method of distribution.

As regards material you may protect a ship either by (*a*) soft wrought iron bolted on to a timber backing, (*b*) a hard steel plate welded on to a back of wrought iron, (*c*) hard steel throughout, or (*d*) a mild steel so admixed with other ingredients as to give it a hard face, or, in other words, a chemically compounded, as distinct from a mechanically compounded, plate. By using the first you get a plate not liable to fracture, and which gives a good resistance to "racking" attack, but fails to keep out "punching" projectiles. By your third you get greater power to resist "punching" attack, but coupled with a liability to fracture under the continuous attack of projectiles incapable of actually perforating it. In your second and fourth materials you have plates possessing a hard face to resist perforation, and a soft and less brittle material behind, holding the plate together and preventing fracture. Here, as in construction, there can be no disputing the point that your compound plates, whether mechanically or chemically created, are the best; and that the ship thus armoured has the highest degree of efficiency as far as the material of this element is concerned. Next you come to the question of distribution of armour. You can protect ships by any one, or by two or more in combination, of three methods.

(*a.*) By vertical plates affixed to the hull.
(*b.*) By vertical plates affixed to the gun positions.
(*c.*) By horizontal plates, *i.e.*, an armoured deck.

Whichever method is chosen the extent and distribution of the

plating may vary enormously. You may give a vessel a complete belt, as is universal with our neighbours across the channel, and in all our earlier ships designed by Sir Edward Reed; or you may armour the vitals and leave the ends to deck-protection only, as in the designs by Sir Nathaniel Barnaby, and with greater length of belt in those of Mr. White. Again, the width of your belt may vary. You can have it rising only up to or barely above the water-line, as in our "Impérieuse" and "Aurora" classes, or you may carry it right up to the battery deck, as in the French "Dupuy de Lôme" and "Bruix" types. Then as to your gun positions, you may enclose them in turrets, or mount your pieces *en barbette;* and you may more or less heavily armour your secondary battery, as in our "Royal Sovereigns," or you may leave it practically unprotected, as in our "Admiral" class. Again, you may protect only the hull of your ship by vertical plates, and leave your gun-positions unprotected, as in some armoured cruisers; or you may trust to deck protection alone, strip your hull of vertical plates, and heavily armour the gun-positions, as in some of the Italian ships.

Finally, if you confine yourself to deck protection only, you can make it either "partial," extending only over the vitals, or "complete," running right fore and aft. You may, moreover, keep it with as few openings as possible, and keep your machinery below it, or adopt vertical engines and run round your engine-hatch a protection of glacis plates sloping upwards from the protection deck. On this question of distribution expert opinion varies very considerably, and certainly for a layman it would be presumption to say, "Such and such is the best method of distribution, and the ship possessing it can claim the highest degree of efficiency." I think, however, I can hope to have the bulk of naval opinion in this room with me if I take it that high efficiency in this element requires a complete belt, or at any rate a big proportion of the whole length belted, a well protected secondary battery, and in the case of a deck-protected ship a fore and aft deck so arranged that engine-room accommodation is not cramped.

Turning to power of offence, we can very briefly summarize it. Complete efficiency requires B.L.R. ordnance for main and Q.F. for secondary armaments. With regard to disposition I will say little. The methods we have adopted for carrying our main armament have been decided on after careful consideration, and would, judging from the discussion on the subject which took place in this theatre some twelve months ago, seem, on the whole, to meet with the approval of those most competent to judge, namely, those on whom the duty of using the weapons will devolve. The fore and aft arrangement removes all danger of the blast from the main ordnance interfering in any way with the secondary battery, a portion of a ship's armament that will play a very important part in an action. It would also appear that what seems to me the weakest point in the distribution of ordnance, namely, the want of good bow and stern fire in many of our cruisers, is being remedied in later designs. Finally comes engine power, and here we may safely take it that modernness and

efficiency are synonymous. The more modern the engines of the ship are, the greater is her speed, the less is her coal consumption, and the lighter is the weight of the propelling machinery that she has to carry through the water. This gives her these advantages: The faster she is the better able will she be to bring on, or avoid, action, as may suit her, and when in action to take the position most advantageous to her. The less her coal consumption, the higher her coal endurance. The less the percentage which the weight of engines bears to the total displacement, the greater will be the amount of displacement that can be afforded to powers of offence and defence. We may, then, take it that the more modern a ship is in this essential the nearer she approaches to the highest type of efficiency.

I have, I think, said enough to show that to arrive at a classification accurate enough to enable us to draw a comparison between two navies we must not only split each of our four main groups into classes differentiated according to the size and power of the ships composing it, but we must also divide each of these classes into two sub-divisions, the one containing all ships modern in every sense of the word, the other those whose value is to a greater or lesser extent impaired by obsoleteness. Such a classification will then show for each ship, (*a*) its sphere of occupation; (*b*) its value within that sphere; and (*c*) the extent to which its value is impaired by obsoleteness. This classification I will make as follows, giving hereafter the reasons which have guided me in adopting it.

Group I. *Battle-ships.*—All armour-clads other than those specially built as, or recognised as only suitable for, (*a*) coast-defence ships, (*b*) cruisers.

Class I.—10,000 tons and upwards.
A. Modern in construction, speed, armament, and protection.
B. Obsolete in one, or more, of the above.

Class II.—Under 10,000 tons.
A. As for Class I, A.
B. As for Class I, B.

Group II. *Coast-defence Ships.*—All armour-clads, specially built as, or recognised as only suitable for, coast defence.

Class I.—Sea-going, *i.e.*, other than in-shore monitors or armour-clad gunboats.
A. 14 knots speed: B.L.R. ordnance.
B. Failing in either of the above.

Class II. In-shore monitors and armour-clad gunboats.
A. 12 knots speed: B.L.R. ordnance.
B. Failing in either of the above.

Group III. *Cruisers.*—All armour-clads specially built as, or recognised as only suitable for, cruisers, and all unarmoured ships (other than torpedo depôt-ships or torpedo-rams) of 2,000 tons and upwards.

Class I.—All armour-clads, irrespective of displacement, and fully protected ships of 7,000 tons and upwards.
A. 16 knots speed: B.L.R. ordnance.
B. Failing in either of the above.

Class II.—Unarmoured ships from 4,000 to 7,000 tons.
A. 18 knots speed: B.L.R. ordnance; full protection.
B. Failing in one or more of the above.

Class III.—Unarmoured ships from 2,000 to 4,000 tons.
A. As defined for Class II, A.
B. As defined for Class II, B.

Group IV. *Scouts.*—All unarmoured ships (other than torpedo depôt-ships or torpedo-rams) between 600 and 2,000 tons.

Class I.—A. 18 knots speed and upward.
„ II.—A. 16 to 18 knots in speed.

Group V. *Torpedo Craft.*—All torpedo depôt-ships, torpedo-rams, torpedo-boat destroyers, and sea-going torpedo-boats.

Class I.—A. Depôt-ships.
„ II.—A. Rams.
„ III.—A. Destroyers (200 to 600 tons).
„ IV.—A. Sea-going boats (over 118 ft. in length).

By this classification all effective war-ships have been collected into 20 sub-divisions, in one or other of which every ship with a definite value and a distinct *rôle* to play finds a place, each sub-division moreover consisting of units so similar that to each the same value may be attached; and the reasons which have guided me in adopting this classification I will now give by dealing with each group *seriatim*.

I. *Battle-ships.*—In this group displacement has been taken as a line of division between the two classes, and for this reason, that increase of size means—or, at any rate, should mean—increase of offensive and defensive power, the most important elements of efficiency in this class of war-ship. In both classes I have, under the head of A (or modern), classed those ships which have (1) hulls of steel (or iron and steel in combination), (2) steel (or steel-faced) armour, (3) breech-loading ordnance, and (4) a maximum speed of not less than 14 knots. Failing in any one of these essentials, they come under the head of B (or old type), and practically this relegates to the B classes all ships laid down prior to 1880. Fixing a speed limit insures that any ship of the A classes could be incorporated in a squadron without reducing its maximum cruising speed below 14 knots, or its manœuvring speed, which may be taken at 2 knots less, below 12 knots. The importance of this is evident when we remember that the want of speed in one or two of the component units of a squadron may prove a source of serious embarrassment to the officer in command, by compelling him to choose between the abandonment of

such vessels to their own defence, or the departure from some line of action which he knows it would be wise to pursue, but which entails a speed of which they are not capable.

II. *Coast-defence Ships.*—In this group seaworthiness and habitability has been taken as the dividing line between the classes; and it would therefore be possible to affiliate any of those in the first class to a sea-going squadron acting within a moderate distance of their base, while those of the second class would find their most suitable sphere in localized operations for the defence of harbours, estuaries, narrow channels, &c. As the work that will devolve on this group is not such as to demand the very highest degree of efficiency in every essential, we take a fair rate of speed and B.L.R. ordnance as qualifications entitling those ships possessing them to rank in the A class.

III. *Cruisers.*—Here also the differentiation into classes has been by size, with the exception that all protected by armour rank in the first class, irrespective of their displacement. This has been done, as the possession of armour protection is a guarantee that the ship possessing it has been designed with the idea of her playing an important *rôle*. In all the classes a high rate of speed, B.L.R., or Q.F. ordnance, and full protection characterize the A ships; and here again the differentiation practically relegates to the B classes all ships more than 10 years old.

IV. *Scouts.*—With this group speed has been made the test of differentiation as to class, and all are grouped as "modern," as, with the exception of the French ships "Milan" (1881), "Condor" and "Épervier" (1883) and "Vautour" and "Faucon" (1885), none were laid down prior to 1885. In this class I have merged all vessels officially classed as "twin-screw gunboats, 1st Class," "torpedo-gunboats," "croiseurs-torpilleurs," or "avisos-torpilleurs," with displacements of 600 tons and upwards; and for this reason.

If a torpedo-gunboat has a displacement of 600 or more tons it ought to possess sea-going qualities capable of enabling it to be useful as a scout; and I take it, moreover, that the main, distinctly offensive war operation that a scout should be considered as capable of performing should be that of defending the squadron to which it is attached against torpedo-boat attack. In short, I take it that a "torpedo-gunboat" should be capable of acting efficiently either as a "scout" or as a "torpedo-boat destroyer," while I look upon a "torpedo-boat destroyer" as utilizable only for attack on torpedo-boats, or delivery of torpedo-attack, and incapable, except in certain waters or under exceptional weather conditions, of effectually acting as a scouting adjunct to a squadron.

V. *Torpedo Craft.*—The differentiation of classes in this group has been into "depôt-ships," "rams," "destroyers," and "sea-going boats;" and, like the scouts, all class as modern,

TABLE I.—*Showing Numerical Strength.*

Flag.	Battle-ships.			C.D. ships.			Cruisers.				Scouts.			Torpedo craft.					Grand total.
	Class I.	Class II.	Total.	Class I.	Class II.	Total.	Class I.	Class II.	Class III.	Total.	Class I.	Class II.	Total.	Class I.	Class II.	Class III.	Class IV.	Total.	
France (A)	16	8	24	2	8	10	9	4	18	31	12	4	16	1	—	10	109	120	201
Russia (A)	9	8	17	2	3	5	7	—	—	7	2	—	2	—	—	14	77	91	122
Franco-Russian (A)	25	16	41	4	11	15	16	4	18	38	14	4	18	1	—	24	186	211	323
Great Britain (A)	28	3	31	3	—	3	22	17	35	74	29	17	46	1	1	46	77	125	279
France (B)	—	7	7	4	—	4	4	3	13	20	—	—	—	—	—	—	—	—	31
Russia (B)	—	1	1	5	14	19	3	1	2	6	—	—	—	—	—	—	—	—	26
Franco-Russian (B)	—	8	8	9	14	23	7	4	15	26	—	—	—	—	—	—	—	—	57
Great Britain (B)	2	17	19	5	7	12	4	8	13	25	—	—	—	—	—	—	—	—	56
Franco-Russian (A and B)	25	24	49	13	25	38	23	8	33	64	14	4	18	1	—	24	186	211	380
Great Britain (A and B)	30	20	50	8	7	15	26	25	48	99	29	17	46	1	1	46	77	125	335

as, with the exception of our "Polyphemus" (commenced in 1878, though not launched till 1881) and the French "Bombe" class (1883), all were laid down in or since 1885. Ships ranging from 200 to 600 tons in displacement are classed as "destroyers," while for torpedo-boats 118 ft. has been fixed as the limit of length entitling them to be considered as sea-going. This latter limitation enables us, therefore, to exclude from consideration all those craft which have to be carried into action on the deck of a large war-ship, as well as those whose lack of sea-going qualities enables them to be used only for localized operations, or in conjunction with fixed land defences.

Based, then, on this differentiation of naval force, I have in Table I summarized the numerical strength of the navy of this country as compared with that of a Franco-Russian alliance, including ships building, or the construction of which has been definitely decided on. Moreover, as the statements regarding the Russian construction of torpedo craft under her last programme are conflicting and in a measure as yet unauthenticated, I have taken six torpedo-boat destroyers and 20 sea-going torpedo-boats as the construction to be entered on, an estimate, if anything, probably under the mark. I have already stated that with regard to elimination for obsoleteness, it is necessary to individually consider the case of each ship, and such a process has led me to disregard those I will now name—

England. C.D. ships: "Prince Albert," "Scorpion," "Wivern," "Viper," "Vixen."
Cruisers: "Nelson," "Northampton," "Shannon," "Hector," "Black Prince," "Warrior," "Inconstant," "Raleigh," "Boadicea," "Bacchante," "Euryalus," "Active," "Volage," "Emerald," "Garnet," "Ruby," "Tourmaline."
Torpedo craft: "Hecla."

France. Battle-ships: "Marengo," "Océan," "Suffren."
C.D. ships: "Bélier," "Bouledogue," "Onondaga."
Cruisers: "Thétis," "La Galissonière," "Triomphante," "Victorieuse."
Scout: "Hirondelle."
Torpedo craft: "Japon."

Russia. C.D. ships: "Kreml," "Pervenets," "Netron Menya."
Cruisers: "Asia," "Afrika."

My reasons for omitting these vessels I will give very briefly.

Great Britain. "Prince Albert," "Scorpion," "Wivern":—Carrying obsolete M.L.R. ordnance, and unarmoured against anything above a 4-in. B.L.R.
"Viper," Vixen":—Officially recognised in the latest Parliamentary Return as "practically worn out."
"Nelson," "Northampton," "Shannon":—Hope-

lessly slow, carrying obsolete M.L.R. ordnance; batteries unprotected except from direct ahead fire, in "Shannon," and from ahead and astern fire, in the other two.

"Hector":—Officially recognised as "unfit for further service."

"Black Prince" and "Warrior":—Obsolete ordnance, unarmoured against anything above a 4-in. B.L.R.; unprotected steering-gear.

"Inconstant," "Raleigh," "Boadicea," "Bacchante," "Euryalus," "Active," "Volage," "Emerald," "Garnet," "Ruby," "Tourmaline":—Obsolete armament, absolutely unprotected, many of their classes already removed from Navy List.

"Hecla":—Old merchant ship, never a fighting craft, and now hopelessly slow.

France. "Marengo," "Océan," "Suffren," "La Galissonière," "Triomphante," "Victorieuse":—Wood hulls, too thinly armoured for the line-of-battle, too slow for cruisers, too deep draught for coast defence. (The "La Galissonière" class draws about 5 ft. more water than the "Penelope." The "Océan" and "Marengo" have about the same draught as the "Royal Sovereign," and the "Suffren" draws $1\frac{1}{2}$ ft. more than the "Benbow," our deepest draught battle-ship.)

"Bélier," "Bouledogue," "Onondaga," "Thetis":—Officially recognised as "sans valeur sérieuse."

"Hirondelle":—Wood hull, launched in '69.

"Japon":—34 years old, no longer officially classed as "transport de torpilleurs."

Russia. "Kreml," "Pervenets," "Netron Menya":—Unarmoured against anything above a 4-in. B.L.R.; practically only floating batteries and very badly protected at that.

"Asia," "Afrika":—Absolutely unprotected; too slow for cruisers; they were bought from Cramp of Philadelphia, and were, I believe, originally designed as merchant ships.

There is, moreover, another reason for eliminating all these vessels from consideration, and one which appears to me unanswerable, and more especially with regard to this country. That is, that it will be of paramount importance to withdraw vessels of doubtful value from active operations in order that their personnel may be better utilized. It would be folly to keep a body of officers and men to man a ship of doubtful value when the supply to equip modern ships will be tested

to breaking strain. The crew of an "Inconstant" would supply complements for a couple of "Apollos" and leave over enough to bring a "Havock" into action.

Besides the vessels eliminated as without serious value, I have not abided strictly to the rules laid down for differentiation in the case of three ships, the French "Amiral Duperré," and the British "Conqueror" and "Hero." The former, strictly speaking, should class as a battle-ship, Class I, B, as she does not fulfil all the conditions entitling a battle-ship to be called modern. I have, however, grouped her in Class I, A, as she only fails in one respect, and that is that she is protected by iron instead of steel or compound armour. Her maximum belt armour is 55 cm. (21·65-in.), thick enough to resist at 1,000 yds. range anything under 13·5-in. B.L.R., or perhaps the new 12-in. B.L.R. Her belt is complete and runs well down to strengthen the ram. Her main ordnance is powerful and her secondary battery numerous, and both are modern. She is a high-freeboard ship with a fair rate of speed. In short, in spite of the slight obsoleteness of her protection she is a powerful, useful battle-ship and fairly entitled to be classed as modern. The "Conqueror" and "Hero," though officially entitled battle-ships, I have classed as coast-defence ships, Class I, A. They are indeed but developments of the "Hotspur" and "Rupert" types, handy rams with a heavy bow fire, but without any powerful stern fire or secondary battery. As such they are specimens of a very high class of coast-defence ship, but I do not think the type can claim to rank as battle-ships until it reaches the large displacement, and acquires the stern fire and secondary battery of the "Sans Pareil" and "Victoria."

By so classing the "Conqueror" and "Hero," I in no way wish to depreciate the sea-going qualities of these ships. I believe them—and I shall be very glad to be corrected if I am wrong—to be as good, if not better, sea-boats than the "Admiral" class. I was present at the last naval manœuvres in the Blue squadron, and I had an opportunity of seeing the "Benbow" and the "Hero" together. Steaming against a heavyish swell, the "Benbow" was taking in a good deal of water over the bows. Anyone forward of the fore barbette would have been pretty damp, to say the least of it, while at the same time men were about on the deck of the "Hero" forward of the turret, and she seemed to be rising easily to it and taking in no water forward.

Table I, however, only affords us a comparison based on numerical strength, and there still remains to be drawn a comparison based more strictly on the war value of each component unit of the two navies. This I will do by assigning to each sub-division a numeral representative of the value of each unit in such sub-division. Thus:—

	Battle-ships.	C.D. ships.	Cruisers.	Scouts.	Torpedo craft.
Class I, A.....	30	10	20	15	15
" I, B.....	15	5	10	—	—
" II, A.....	20	6	16	10	10
" II, B.....	10	3	8	—	—
" III, A.....	—	—	10	—	5
" III, B.....	—	—	5	—	—
" IV, A.....	—	—	—	—	2

To assign to any class a numeral representative of its total value, I multiply the number of ships in the class by the unit value, and the result expressed decimally gives the value of the class as a whole. For example, we possess, or rather will possess, 28 battle-ships Class I, A, and the unit value of the class is 30—

$$\therefore\ 28 \times 30 = 840 \text{ and } \frac{840}{100} = 8{\cdot}4.$$

i.e., value of battle-ships Class I, A.

In this manner I have calculated the war value of the various navies with the result summarized in Table II (p. 1220).

While claiming for this table that it fairly represents the value of each class, I, of course, admit that in cases the full value is not given to a ship as compared with other ships credited with the same value. For instance, both the "Powerful" and "Aurora" are each, as units of cruisers Class I, A, credited with a value of ·2, although the former will undoubtedly be a much more powerful ship than the latter. But as a matter of fact the ships over-rated and those under-rated about balance one another, and so the unit taken is in fact representative of the *average* value of a ship of the class. I believe that, apart from the lengthy and laborious process of comparing ship by ship right through, no fairer test than that I have adopted could be found. I must, however, urge you to remember that each group has been treated perfectly apart, and that no comparison between different groups is admissible. For instance, I assign 30 as the unit value for a modern 1st class battle-ship, and 20 as the unit value for a modern 1st class cruiser, but I by no means assume that three 1st class cruisers are an equivalent for two modern battle-ships. There can be no comparison whatever between the two types of ship, as they are designed for totally different functions. What may be an absolute essential for efficiency in one type may be unnecessary, or of only secondary importance, in another. The adding together, however, of the values of the various groups does give us a fair idea of the total value of a navy, and for this reason. By keeping each group apart we have got a definite value for each group, which must necessarily be the equivalent of the value which the naval policy of the country attaches to that particular group. The preponderance in strength of our cruisers is a good typical case. Our strength in this group is clear evidence that the necessity for securing protection to our commerce and food supplies must be one of

Table II.—Showing War Value.

Type.		Franco-Russian Alliance.									Great Britain.		
		France.			Russia.			Total.					
		A.	B.	Total.	A.	B.	Total.	A.	B.	Total.	A.	B.	Total.
Battle-ships.	Class I.	4·8	—	4·8	2·7	—	2·7	7·5	—	7·5	8·4	·3	8·7
	Class II.	1·6	·7	2·3	1·6	·1	1·7	3·2	·8	4·	·6	1·7	2·3
	Total.	6·4	·7	7·1	4·3	·1	4·4	10·7	·8	11·5	9·	2·	11·
C.D. Ships.	Class I.	·2	·2	·4	·2	·25	·45	·4	·45	·85	·3	·25	·55
	Class II.	·48	—	·48	·18	·42	·6	·66	·42	1·08	—	·21	·21
	Total.	·68	·2	·88	·38	·67	1·05	1·06	·87	1·93	·3	·46	·76
Cruisers.	Class I.	1·8	·4	2·2	1·4	3	1·7	3·2	·7	3·9	4·4	·4	4·8
	Class II.	·64	·24	·88	—	·08	·08	·64	·32	·96	2·72	·64	3·36
	Class III.	1·8	65	2·45	—	·1	·1	1·8	·75	2·55	3·5	·65	4·15
	Total.	4·24	1·29	5·53	1·4	·48	1·88	5·64	1·77	7·41	10·62	1·69	12·31
Scouts.	Class I.	1·8	—	1·8	·3	—	·3	2·1	—	2·1	4·35	—	4·35
	Class II.	·4	—	·4	—	—	—	·4	—	·4	1·70	—	1·70
	Total.	2·2	—	2·2	·3	—	·3	2·5	—	2·5	6·05	—	6·05
Torpedo Craft.	Class I.	·15	—	·15	—	—	—	·15	—	·15	·15	—	·15
	Class II.	—	—	—	—	—	—	—	—	—	·1	—	·1
	Class III.	·5	—	·5	·7	—	·7	1·2	—	1·2	2·3	—	2·3
	Class IV.	2·18	—	2·18	1·54	—	1·54	3·72	—	3·72	1·54	—	1·54
	Total.	2·83	—	2·83	2·24	—	2·24	5·07	—	5·07	4·09	—	4·09
Grand total		16·35	2·19	18·54	8·62	1·25	9·87	24·97	3·44	28·41	30·06	4·15	34·21

the main factors which govern our naval policy. It is, therefore, only right that strength in any particular group should have its full effect in estimating the total strength of a navy. Moreover, this method of comparison enables us to ascertain on broad lines the conditions which govern the naval policy of a Power, by noting the proportion borne by the different groups to the naval force as a whole.

In conclusion, I will, after this explanation, briefly analyze the figures given in Table II. Everyone will admit that the lowest minimum for our war-strength must be a superiority to a Franco-Russian alliance, and if we take into consideration only the totals of the respective fleets it would appear as if we held this superiority. But a moment's consideration will show us that such is not really the case. Superiority in one group does not necessarily counterbalance inferiority in another. It may mean only that the requirements of our position demand a specially powerful force of ships of this particular group, whereas the conditions governing the naval policy of France and Russia may render the possession of strength in this particular group a matter of secondary importance. Our rule should read thus: The strength of each group in the British Navy must be, to the strength of the corresponding group in the allied navy, equivalent, not merely in value, but in a direct ratio to the interests such groups have to safeguard. Dealing with each group separately, we find that in battle-ships we are in an inferiority. Our existence as a nation depends on our supremacy at sea, and for holding such supremacy battle-ships, and battle-ships only, can suffice. In this group our inferiority is in vessels of the second class, and, what is worse, our inferiority is entirely in those of modern type. In coast-defence ships we can accept our position, as a superiority in this class is not a part of our naval requirements. With regard to cruisers, we have, it is true, a superiority of 12·31 as against 7·41; but is this sufficient? It is simply a truism to say that our national existence is bound up in our commerce to an infinitely greater degree than is the case with either France or Russia, and yet France, to correspond with a mercantile marine but slightly over a million tons and sea-borne commerce valued at less than 300 millions, has a cruiser strength of 5·53; Russia, whose mercantile marine aggregates less than half a million tons, and whose sea-borne commerce represents only 55 millions, has a cruiser strength of 1·88; while Great Britain, with her 12 million tons of merchant shipping, and her sea-borne commerce valued at nearly *one thousand millions*, has only a strength of 12·31! In the face of these figures, is it possible to maintain that our cruiser strength is adequate to fulfil the duties that an outbreak of war will entail upon it? Turning to scouts, we find, again, that our superiority is marked. We must, however, remember that the *rôle* our squadrons will have to play will be that of a blockading force. In these days of steam, and considering the extent to which torpedo attack has developed, such a blockade must be a "masking" one. The squadrons will not lie in-shore, but will trust to their cruisers and scouts to keep them in

touch with the enemy. The demand, therefore, on this class will be very great, and our superiority in this type is not one whit more than is necessary. Finally, we come to torpedo craft, in which we again find ourselves in an inferiority. This inferiority, however, lies only in torpedo-boats, a type of war-ship which does not find much scope in our scheme of naval policy. Thanks to the recent progress made in the construction of "destroyers," the most useful type of torpedo craft to a nation bound to hold the supremacy of the sea, we, in this group, may be considered as holding our own.

We may then take it that we possess an adequate strength in coast-defence ships and torpedo craft, are inferior in battle-ships, and that our superiority in cruisers and scouts, though marked, does not reach the standard to which it should attain when we consider the heavy work which will fall on these two classes of war-ship, when war breaks out, or, to put it more strongly, our inferiority, on the whole, is marked, as we are superior only in those classes on which, in our navy, a demand will be made far in excess of that which will be made on their corresponding groups in the navies of the Alliance, and we are, moreover, inferior in that class of war-ship most absolutely essential to the Power to whom it is vital to retain the supremacy of the sea. From this I can draw but one conclusion, and that is, that our future construction should be in the main devoted to battle-ships, with, of course, the proviso that such an allotment of displacement be given to cruisers and scouts as to well maintain our superiority in these groups, and, as far as money is available, without reducing battle-ship construction, this superiority should be increased. Construction of vessels like the "Alert" and "Torch" appears to me to be neither wise nor economical. Admiral Colomb has well said that this country should never build a ship which does not "designedly occupy her place in the great scheme of preparation for war."

We can build ships for peace services, but we should see to it "that above and beyond this they will fall immediately into their places on a declaration of war." What place can a 13-knot sloop like the "Alert" fill in any scheme of modern naval war? In the United States they can turn out 16-knot boats on the same displacement, carrying a more powerful armament, and for almost the same cost, as our "Alert." Which is the most likely to be useful in actual war? In fact, our peace ships, if I may so term them, should all be 16-knot boats. With regard to battle-ships, it would appear as if medium-sized ships were what we most wanted. "Barfleurs" rather than "Royal Sovereigns," "Renowns" rather than "Magnificents." Two years ago, in the pages of the *United Service Magazine*, I ventured to suggest the "Alexandra" as a type that might be reverted to and improved upon, and quite recently Lord Brassey, in a letter to the *Times*, advocates the same type, with the addition of a turret aft of the battery. Surely, we want some fast and powerful light-draught vessels of 8,000 to 10,000 tons in displacement. France and Russia each have eight of this class built or building. Another type which I think would be welcomed in the navy is a scout, of, say, 2,000 tons, in which armament and protection should be entirely subsidiary to

speed and sea-going qualities. Improved "Alacrity's," in fact—ships with a high freeboard, capable of keeping their speed in a seaway, with ample engine-room space, carrying nothing heavier than a 25-pounder quick-firer—ships, in short, built to be above all fast, sea-going, and habitable. A dozen vessels of this class could be built for the cost of one "Magnificent," and would be a reinforcement to our fleet of incalculable value when the day of trial comes. Before sitting down I will again apologise for my presumption in having ventured to address an audience of experts, and more especially for venturing to suggest types for construction. This latter I have done because I believe that they are types which the bulk of naval opinion would gladly see embodied in our fleet; and I am anxious to ascertain whether I am right or wrong in that belief. My being here at all is due to the fact that a naval officer, well known to many in this audience, was kind enough to assure me that "naval officers are quite ready to hear intelligent civilians on these subjects," and was flattering enough to say that he thought my paper "interesting, and giving the basis for useful discussion by naval men."

Battle-ships.

Class I, A.		Class II, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Royal Sovereign	Charlemagne	Collingwood	Caïman
Royal Oak	Henri IV	Colossus	Terrible
Ramillies	St. Louis	Edinburgh	Indomptable
Repulse	Masséna	(3)	Requin
Resolution	Bouvet		Bouvines
Revenge	Lazare Carnot		Tréhouart
Empress of India	Charles Martel		Jémappes
Hood	Jauréguiberry		Valmy
Barfleur	Brennus		(8)
Centurion	Hoche		
Renown	Magenta		Navarin
Magnificent	Marceau		Alexander II
Majestic	Neptune		Nicolai I
Nile	Amiral Baudin		Twelve Apostles
Trafalgar	Formidable		Gangoot
Anson	Amiral Duperré		Cissoi Veliki
Benbow	(16)		Cissoi Veliki No. 2
Camperdown			Cissoi Veliki No. 3
Howe	Sevastopol		(8)
Rodney	Petropaulovski		
Sans Pareil	Poltava		
Prince George	Catherine II		
Victorious	Tchesmé		
Hannibal	Sinope		
Illustrious	George the Victorious		
Cæsar	Three Saints		
Jupiter	Paris		
Mars	(9)		
(28)			

Battle-ships—continued.

Class I, B.		Class II, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Inflexible Dreadnought (2)		Devastation Thunderer Neptune Alexandra Superb Sultan Ajax Agamemnon Téméraire Monarch Bellerophon Hercules Audacious Invincible Iron Duke Swiftsure Triumph (17)	Courbet Dévastation Redoutable Colbert Friedland Trident Richelieu (7) Petr Veliky (1)

Abstract.

	Great Britain.	France and Russia.
Class I, A	28	16 + 9 = 25
„ II, A	3	8 + 8 = 16
	31	24 + 17 = 41
„ I, B	2	0 + 0 = 0
„ II, B	17	7 + 1 = 8
	19	7 + 1 = 8
Total	50	31 + 18 49

Coast-defence Ships.

Class I, A.		Class II, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Rupert Conqueror Hero (3)	Furieux Tonnerre (2) Admiral Senjavin Admiral Ushakoff (2)		Flamme Fusée Grenade Mitraille Achéron Cocyte Phlégéthon Styx (8) Otwajnee Gremyastchy Gro..astchy (3)

Class I, B.		Class II, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Hotspur Glatton Belleisle Orion Penelope (5)	Fulminant Tonnant Tempête Vengeur (4) Admiral Lazareff Admiral Greig Admiral Chicagoff Admiral Spiridoff Kniaz Pojarski (5)	Cyclops Gorgon Hecate Hydra Cerberus Abyssinia Magdala (7)	Novgorod Popoff Smertz Tcharodeika Ouragan Tifun Streletz Edinorog Bronenosetz Latnik Lava Perun Vestchun Koldun (14)

Abstract.

	Great Britain.	France and Russia.	
Class I, A	3	2 + 2	= 4
„ II, A	—	8 + 3	= 11
	3	10 + 5	= 15
„ I, B	5	4 + 5	= 9
„ II, B	7	0 + 14	= 14
	12	4 + 19	= 23
Total	15	14 + 24	= 38

Cruisers.

Class I, A.		Class I, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Powerful. Terrible. Impérieuse. Warspite. Aurora. Australia. Galatea. Immortalité. Narcissus. Orlando. Undaunted. Blake. Blenheim. Edgar. Crescent. Grafton. Gibraltar. Royal Arthur. Endymion. Hawke. Theseus. St. George. (22)	Dupuy de Lôme. Bruix. Chanzy. Charner. Latouche Tréville. Pothuau. Jeanne d'Arc. D'Entrecasteaux. Tage. (9) Rurik. Rossia. Rossia No. 2. Admiral Nakhimoff. Dimitri Donskoi. Vladimir Monomach. Pamyat Azova. (7)	Agincourt. Minotaur. Northumberland. Achilles. (4)	Bayard. Turenne. Du Guesclin. Vauban. (4) Edinburghski. General Admiral. Minin. (3)

Class II, A.		Class II, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Eclipse. Minerva. Talbot. Flora. Forth. Fox. Hermione. Astræa. Bonaventure. Cambrian. Charybdis. 6 new. (17)	Cécille. Alger. Isly. Jean Bart. (4)	Forth. Mersey. Severn. Thames. Amphion. Arethusa. Leander. Phaeton. (8)	Sfax. Duquesne. Tourville. (3) Korniloff. (1)

Cruisers—continued.

Class III, A.		Class III, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Æolus.	Bugeaud.	Iris.	Duguay-Trouin.
Brilliant.	Chasseloup-Laubat.	Mercury.	D'Estaing.
Indefatigable.	Friant.	Calliope.	La Pérouse.
Intrepid.	Davoust.	Calypso.	Nielly.
Iphigenia.	Suchet.	Canada.	Primauguet.
Pique.	Descartes.	Carysfort.	Forfait.
Rainbow.	Pascal.	Champion.	Magon.
Retribution.	D'Assas.	Cleopatra.	Roland.
Sirius.	Du Chayla.	Comus.	Villars.
Spartan.	Catinat.	Conquest.	Aréthuse.
Andromache.	E. 4.	Constance.	Dubourdieu.
Apollo.	E. 5.	Cordelia.	Naïade.
Latona.	E. 6.	Curaçoa.	Iphigénie.
Melampus.	Cassard.	(13)	(13)
Naiad.	G. 4.		
Sappho.	Galilée.		Rynda.
Scylla.	Linois.		Pamyat Merkuriya.
Sybille.	Lavoisier.		(2)
Terpsichore.	(18)		
Thetis.			
Tribune.			
Magicienne.			
Marathon.			
Melpomene.			
Medea.			
Medusa.			
Pallas.			
Pearl.			
Phœbe.			
Philomel.			
Katoomba.			
Mildura.			
Ringarooma.			
Tauranga.			
Wallaroo.			
(35)			

Abstract.

	Great Britain.	France and Russia.
Class I, A	22	9 + 7 = 16
„ II, A	17	4 + 0 = 4
„ III, A	35	18 + 0 = 18
	74	31 + 7 = 38
„ I, B	4	4 + 3 = 7
„ II, B	8	3 + 1 = 4
„ III, B	13	13 + 2 = 15
	25	20 + 6 = 26
Total.....	99	51 + 13 = 64

Scouts.

Class I, A.		Class II, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Dryad	Fleurus	Barham	Condor
Halcyon	Wattignies	Bellona	Épervier
Harrier	Milan	Barracouta	Faucon
Hazard	Cosmao	Barrosa	Vautour
Hussar	Coëtlogon	Blanche	(17)
Alarm	Forbin	Blonde	
Antelope	Lalande	Scout	
Circe	Surcouf	Fearless	
Hebe	Troude	Archer	
Jason	Cassini	Brisk	
Jaseur	D'Iberville	Cossack	
Leda	Casabianca	Mohawk	
Niger	(12)	Porpoise	
Onyx		Racoon	
Renard	Zacken	Tartar	
Speedy	Ilyn	Alacrity	
Gossamer	(2)	Surprise	
Gleaner		(17)	
Salamander			
Seagull			
Sharpshooter			
Sheldrake			
Skipjack			
Spanker			
Speedwell			
Assaye			
Plassy			
Boomerang			
Karakatta			
(29)			

Abstract.

	Great Britain.	France & Russia.
Class I, A..	29	12 + 2 = 14
„ II, A..	17	4 + 0 = 4
Total ..	46	16 + 2 = 18

Torpedo Craft.

Class I, A.	
Great Britain.	France and Russia.
Vulcan (1)	Foudre (1)

Class II, A.	
Great Britain.	France and Russia.
Polyphemus (1)	

Class III, A.	
Great Britain.	France and Russia.
4 "Rattlesnake" class 42 "Havock" class (46)	2 "Léger" class 8 "Bombe" class (10) 2 "Gaidamak" class 6 "Kazarsky" class 6 new ships (14)

Class IV, A.	
Great Britain.	France and Russia.
77 boats (77)	109 boats (109) 77 boats (77)

Abstract.

Class I, A	1	1 + 0 =	1
,, II, A	1	0 + 0 =	0
,, III, A	46	10 + 14 =	24
,, IV, A	77	109 + 77 =	186
Total..	125	120 + 91 =	211

TABLE III.—*Summary of Tables I and II.*

Differentiation.	A ships.				B ships.				Total fleet.			
	Great Britain.		France and Russia.		Great Britain.		France and Russia.		Great Britain.		France and Russia.	
	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.
Strength in battle-ships	31	9·00	41	10·70	19	2·00	8	0·80	50	11·00	49	11·50
„ coast-defence ships ...	3	0·30	15	1·06	12	0·46	23	0·87	15	0·76	38	1·93
„ cruisers	74	10·62	38	5·64	25	1·69	26	1·77	99	12·31	64	7·41
„ scouts	46	6·05	18	2·50	..	..	..	..	46	6·05	18	2·50
„ torpedo craft	125	4·09	211	5·07	..	..	..	..	125	4·09	211	5·07
Total strength	279	30·06	323	24·97	56	4·15	57	3·44	335	34·21	380	28·41

Admiral Sir ERASMUS OMMANNEY, C.B.: I think we are under a deep debt of gratitude to the lecturer for the very comprehensive paper he has brought before us. I am sure the amount of labour and research which he must have undergone to do this has rendered a great service to the navy and to the country in general. I am not sufficiently in touch with the details of the Service now to make any criticism of the paper which we have just heard read with so much interest. I generally approve of what he has given us, with one part more particularly: I think he produced a very methodical and accurate classification of ships. I do not know whether it corresponds with what the Admiralty have adopted, but I think it is one deserving of the very greatest attention. The paper contains information which is very much to be desired for the public in general. I hope it will receive a very large circulation, for I am sure it will be of great interest to all the maritime population of this kingdom and to the Naval Service in particular. I can say no more than to express my great pleasure at having been here to hear this paper read. Did I gather that the French have a larger proportion of obsolete ships than we have?

Mr. SWINBURNE: Do you mean France alone or the Franco-Russian?

Admiral Sir ERASMUS OMMANNEY: The French and Russians together, if you like.

Mr. SWINBURNE: France and Russia together have 57 as against our 56. In fact, our cruisers are almost identical: we have 25 against their 26. But they have only eight obsolete battle-ships in the whole of their battle-ship strength, whereas out of our battle-ship total of 50, 19 are more or less obsolete.

Admiral OMMANNEY: That shows the great importance of your paper in bringing this information before us.

Admiral P. H. COLOMB: I think one of the reasons why nobody rises to discuss this paper is because it is more, perhaps, a paper to be read and studied than to be discussed off-hand. On first glancing it over, I thought it might be a paper that could be easily criticised. On reading it more closely I find that that is not so. Although the lecturer appeared in the early part of his paper to overlook certain very important points, yet in the latter part he shows that he has not overlooked them at all. Those important points I take to be these: that the differentiation of naval force for comparative purposes depends upon what the force is going to do; that you have a differentiation in a country which has to defend its waters, which will certainly not be that of a country which has to attack those waters. Therefore, if you compared ship with ship, class with class, and went no further, you would be doing wrong. But I think we must credit the lecturer with perfectly seeing that point, as in his later remarks especially he throws away those parts of our organization in which we may appear weak, because, as he says, those are not parts which would be called much into play in case of war. I take it the differentiation of force for the defence will be different from that for attack, and I think it is clear that our differentiation must be the differentiation for defence: that we are to hold the waters; that we are to keep our roads clear; that it will be the endeavour of any enemy, such as France, or France and Russia combined, to interfere with our hold of those waters and to occupy those roads. Therefore I think we should find that speed was not with us, or ought not, at any rate, to be with us, so strong a differentiation as other elements. In old times, the differentiation was chiefly in defensive force, and the ships which claimed to have greater power of resistance than others sacrificed speed for that purpose. On the other hand, those ships which were anxious to increase their speed sacrificed their force for it, and I think that must still be so with us. Those classes of ships which have to maintain a position must sacrifice speed for force, offensive and defensive, while those ships which might be required to cross, as it were, into the enemy's territory might sacrifice force for speed. The author of the "Navire de Combat," published in France last year under a pseudonym, puts the differentiation in this way:—Speed first; then the ram; then the gun; and then the torpedo. I do not know that that method of differentiation would be perfectly satisfactory for us. We may have difficulties now, inasmuch as weapons which did not exist in the old times must differentiate to some extent. The ram, however, has not so much power, because we can apply it to almost any ship; it does not interfere with her

other qualities. The torpedo, to a certain extent, is applicable to any ship, and does not so much necessarily alter the class of ship. The guns and armour seem to be the chief differentiators of naval force. The amount we put on for armour, and the size of the gun we carry, seems to be that which chiefly determines the size of our ship. I am not quite prepared to agree with the grouping the lecturer has put forward in bringing in as he does the coast defence as one of four groups of duties which would have to be done by our ships. As I view the *rôle* of the coast defence ship it is more that of fixed guns in the fortress when the army has been driven behind them and has cut off their supplies: that is to say, they are not a part of the army, but they are a protection to the army when it gives up the territory outside. I always feel a slight shrinking when I find in England the coast defence system brought at all into discussions as to the general condition of naval affairs. So far as I understand the question, it cannot possibly come in till that naval force is destroyed or forced back into its harbours. But the lecturer corrects the first impression one might get by pointing out, towards the end of his lecture, that after all coast defence ships do not come in as part of our naval polity. The author takes the duties which different classes of ships have to perform fairly well, except that I think it would have been better if he had in the first instance left out the coast defence ships altogether as not being part of the organization. With regard to the battle-ships, I think we cannot call them in any way an outlying line of defence which may be broken and then may be defended by a line farther in. It seems to me if the battle-ships are defeated there will be an end of it; if that line is driven in, no other line can hold its place. Mr. Swinburne says: "cruisers and scouts play two *rôles*." I think that is quite right. But I think the *rôle* of the cruisers is more after all taking possession of certain waters and holding them than anything else. Certainly that was so in the old war. Our cruisers, certainly, for the protection of our commerce, took certain positions in the tracks of our merchant ships and held them. The fact of their being in those positions prevented the enemy from coming anywhere near, and left the roads free for the merchant ships to pass. But undoubtedly that duty is a different duty from that which belongs to the cruiser when she is attached to a fleet. If we look back in history we shall see that when we did attach cruisers to the fleet, which we were generally very loth to do, having so few to spare, those ships had qualifications which were not the same as those they used for holding certain waters. The lecturer, we must understand, is differentiating the force, not with a view of showing us how a force ought to be distributed so much as saying, "Now you have this force: if you look at it from a different point of view you will be able to see how it classifies, how it agrees, or how it differs, what its superiority or inferiority is to the force of possible enemies." He takes, for instance, two classes of battle-ships. It is difficult to say why you should have two classes of battle-ships, except upon this ground: it is inconvenient for many reasons to send a first class battle-ship to foreign waters, to the West Indies, the East Indies, China, South Africa, and so on, and therefore there seems good reason, and always has been historically good reason, for having a smaller class of battle-ships for the purpose. But if we say that there are two classes of battle-ships with the apparent idea that they are going to fight in one line or formation, then we are historically incorrect, and, I think, physically incorrect. Our line formation of battle-ships ought to be uniform. We cannot justify, on any technical ground, the placing of a weak ship amongst strong ships which are to fight together, or the placing of a strong ship amongst weak ships with the same view. I think we might divide the *rôles* that our ships have to perform into really three broad classes:—Firstly, holding the sea against fleets or cruisers, which must be done by battle-ships; secondly, the holding of the sea against cruisers only, which can be done by cruisers only; and thirdly, the watching of the enemy's ports, and I think the lecturer and I agree on this point. I am very glad to see Mr. Swinburne eliminating on both sides the ships that are obsolete and do not come into the classification properly. On both sides it is very important. There is difficulty in comparing force with force unless we largely eliminate from both sides the ships which are obsolete. The lecturer makes a wise remark where he says, "It would be folly to keep a body of officers and men to man a ship of doubtful value when the supply to equip modern ships will be tested to

breaking strain." I think that is a very shrewd and valuable remark. I am sure it is one which will be noted when this paper goes out to the navy. I think he is wise, again, in drawing our attention to the fact, and I believe the navy will go thoroughly with me there, and I am not aware that it has been so distinctly said before, that we cannot make any comparison between given groups of different classes of ships. With one class of ships for one thing and another class of ships for another thing we cannot, by lumping them, so to speak, make the one force answer to the other force. I think that, also, a remark worth its weight in gold. But then the lecturer points out that we "ascertain on broad lines the conditions which govern the naval policy of a Power by noting the proportions borne by the different groups to the naval force as a whole," and it gives us the key to the method we ought to pursue to meet that probable policy. Then he says, wisely again, I think, "Superiority in one group does not necessarily counterbalance inferiority in another." That is a true remark. Then he says: "In these days of steam, and considering the extent to which torpedo attack has developed, such a blockade must be a 'masking' one. The squadrons will not lie in-shore, but will trust to their cruisers and scouts to keep them in touch with the enemy." I believe—as far as I can see the drift of opinion—that that is a growing view in the navy. We do not look much to stationing the fighting force, as it were, off the enemy's port, but we look more and more every day to the watching ships, giving the fighting ships notice of possible movements of the enemy, in order that if they do come out they shall be followed and caught by the fighting force; but you do not keep the fighting force off the port to waste itself. I think the paper is a really good solid paper, and I consider the lecturer has been very well advised in reading it. Naval officers might not agree, perhaps, to every part of it, but the point is this, that if a layman comes forward and speaks fairly in accordance with the naval view, he is quite certain to put it in words that the public will understand, where a naval expert, who might know very much better what he meant, might have much more difficulty in putting himself *en rapport* with the public mind. I think there is great advantage to the Naval Service and to the public generally when laymen come to this Institution and give us the benefit of their thoughts as the lecturer has done to-day.

Colonel BAYLIS, Q.C.: I, as a layman, also am much struck with the popular language in this lecture, and also with the value of the statistics and their excellent arrangement.

Mr. EDWARD HICKS: I, also as a layman, should like to add my thanks to those which have already been given to Mr. Swinburne for his excellent lecture.

Mr. SWINBURNE in reply said: I am most flattered at the reception I have met with. I would just like to say I came here with no intention of attempting to enter on a discussion with professional men; but merely to elicit naval views on a question which I think is one of the very greatest interest to the public, and I read the paper mainly with the idea of eliciting what naval men think on the matter. I should, however, like to say a word on this question of differentiation. I take it from Admiral Colomb that all battle-ships to go into the line of battle should be on an equality, as I group them: for example, would you put the "Barfleur" as an equal ship to go into line of battle with the "Royal Sovereign"?

Admiral COLOMB: My point of view would be that there ought not to be the least difference between the "Royal Sovereign" and the "Barfleur;" that if those ships are intended to serve in the same fleet they ought to be the same class of ship.

Mr. SWINBURNE: Broadly speaking, do you not think they are on an equality as regards class? Of course the "Royal Sovereign" is a more powerful vessel.

Admiral COLOMB: No, I suppose they are not.

Mr. SWINBURNE: But what I mean is, if you form a squadron, say to protect the Mediterranean, you must have some ships much more powerful than others. I merely bring this forward because the question of coast defence has been brought in. I do not think coast defence is a naval matter whatever, *i.e.*, I do not think a ship intended for coast defence has a right to rank as a naval asset. She is part of the localised defence.

Admiral COLOMB: You would not bring her in.

Mr. SWINBURNE: No, but we have ships which are sea-going; you have nowhere to put them if you cannot bring them into line of battle. They certainly are not cruisers, and I introduced the "coast defence" simply as a place for those vessels. You can hardly eliminate them.

Admiral COLOMB: Of course that is a different question. My own impression is in war you would have ships, we always used to have ships that you did not consider were up to the line of battle, yet if you had no other service for them we could use them and put them in.

Mr. SWINBURNE: There is another point I should like to note on the question of differentiation between cruisers and scouts. Will you in your next great naval war utilise powerful ships like the "Aurora" class, the "Royal Arthur" class for scouting? Will you attach them to the squadron, or will you send them out for the protection of commerce and trade routes?

Admiral COLOMB: All you can say is in former times it was the big ships that were attached to fleets as scouts, and I think that would be so.

Mr. SWINBURNE: I thought rather the other way, that you would have so much more heavy duties to fall on your large vessels that you would utilise your smaller craft such as the "Scout" and "Archer" class, and "Barham" for scouting purposes entirely, not for commerce defence.

Admiral COLOMB: These are very difficult questions, but what you used to do was to group your weaker vessels in pairs and those generally in pairs could hold the waters they were intended to hold for the protection of commerce. They had not the size or speed necessary for scouts, so that I take it you would be obliged to use your heavier cruisers because they have the speed and coal supply necessary as scouts for the fleet, whereas with the smaller group you would be able to hold certain waters where speed was not called in question.

Mr. SWINBURNE: You have hit on what I considered to be the chief point.

Admiral COLOMB: I do not know whether I am quite in order.

The CHAIRMAN: I think this is exceptional.

Mr. SWINBURNE: That question of not being able to compare two classes was really one of the chief reasons that led me to write this paper and to read it here, because I do not think the average layman does understand that point. He sees two large ships together, one a battle-ship and the other a cruiser, and because they are both large vessels he believes they are both battle-ships, and fails to realise that they differ enormously in essentials, and are intended to play totally different *rôles*.

The CHAIRMAN (H.S.H. Prince Louis of Battenberg): I am sorry, for the sake of the lecturer, that there has been so little for him to reply to in criticism, but I agree with Admiral Colomb that this is much more a paper to be studied and thought about than one to be discussed on the spot. Of course the ordinary duty of a chairman would be to sum up the expressions of opinion, but as there have been practically none I will confine myself to my own views on the subject. I feel myself very much in sympathy with the lecturer in his opening remarks. I thought of it this morning when I read in the "Times," from their own correspondent in Paris, that the *gunboats* "Hoche" and "Neptune" were ordered somewhere; and yesterday another paper spoke of them as the "men-of-war" "Hoche" and the "cruiser" "Neptune," implying that a cruiser was not a man-of-war; it is impossible to conceive greater nonsense. Going through this classification carefully I confess on the whole I feel myself in accord with the lecturer, but I think it is well to point out that however praiseworthy and desirable it is to arrive at some classification and differentiation, it is based upon what must necessarily be an arbitrary proceeding; that is to say you must draw the line under different heads—displacement, speed, armament, obsoleteness, and so forth. Now, who is to say where this line is to be drawn. For purposes of comparison with other navies, it is obvious that by a little manipulation, drawing the line a little higher up or lower down, you can considerably increase one class of vessels or decrease another class. At any rate the picture is somewhat misleading. An example which occurs to me is that of the cruisers; it affects this country more especially. Turning to the tables at the end I find under "Cruisers," Class II and III, by fixing 4,000 tons as the limit between the two classes you get into Class II the whole of the

ships of the so-called "Astræa" class, but you relegate to Class III the whole of the ships of the "Apollo" class. I quite admit that the "Astræa" is a better ship than the "Apollo," but whether she is so very much better as to merit a superior class is perhaps a question of opinion. The chief defects of the "Apollo" class were: not sufficient coal endurance, and the fact that her broadside guns were placed too low. Both these are corrected in the "Astræa" class. As such they are better, but how much better is difficult to say. The point where I part company with the lecturer is when he begins to give numerical values to ships of different classes. The lecturer says, "I assign 30 as the unit value for a modern 1st class battle-ship, and 20 as the unit value for a modern 1st class cruiser, but I by no means assume that three 1st class cruisers are an equivalent for two modern battle-ships." This is very sound as a principle, and I do not see much object in giving numerical values to individual ships and classes. It follows logically from this that if you add up the totals of these numerical values, and finally say the grand total of the war fleet of England is 34·2 as against 28·4 of France and Russia, it is distinctly misleading; moreover, it is really doing that which the lecturer very properly tells us we should not do. We add up fictitious values of different classes of ships and then compare the totals. I should have been glad if this "addition" had been left out of the table, because it may lead to wrong conclusions being drawn. When it comes to discussing what should be our future building programme and so forth, I think it is a subject I would rather not touch upon. I do not know what the Admiralty programme is, and it is also somewhat beside the subject under discussion. There is another point I omitted to mention when talking of drawing the line under different headings; I refer to "obsolete," which is an extremely wide term nowadays. Things go so rapidly that very likely in a few years' time we shall call any ship "obsolete" that has not got water-tube boilers or "induced draught." Similarly as to the larger Q.F. guns. Unquestionably a ship armed with 6-in. Q.F. guns with four times the rapidity of fire is a better ship than one armed with 6-in. ordinary B.L. guns. So that under that heading a list like this would have to be constantly revised. I think that is all I have to say. I am glad to think that though there are very few of my brother officers here to-day, some 4,000 or 5,000 copies of this lecture will be going out to all parts of the world, and I believe it will be received with much satisfaction. It is now my pleasant duty to offer to Mr. Swinburne the best thanks of this meeting for the very great trouble and pains he has been to in preparing the paper, which must tend not only to correct the mistakes which are mentioned in the opening paragraphs of the paper, but also to enable the public generally to put a proper value on the different fighting units of the English and other navies.

Wednesday, June 27, 1894.

Admiral Sir ANTHONY HILEY HOSKINS, G.C.B., in the Chair.

Discussion on Naval Prize Essay.

Admiral Cleveland: I will open this discussion, not because my antecedents particularly qualify me in criticising a paper upon naval tactics, but because I wish to show my appreciation and acknowledgment of naval officers coming here to give us their ideas upon these very important matters. I only wish more naval officers could see their way to reading papers on naval matters in this theatre. There seems to be some idea in naval circles that public discussion of professional matters is looked upon with discouragement by the Admiralty, but I do not think that is the case, provided it is done under some sense of responsibility. At all events, there can be no better place, especially for those not in immediate touch with the authorities, to discuss and thresh out questions of strategy and tactics than this Institution. I will now proceed to make a few running comments upon the essay. I see the essayist has taken as a starting point 1880; there is no doubt there have been very great changes, both in the offensive and defensive powers of ships, since that time, which have, of course, led to some modification in tactics. Sir Edmund Fremantle was the essayist on that occasion. The present essayist points out, on p. 367, the different elements which have caused this modification, viz., "greater economy in the expenditure of fuel," "the propelling power of the ships has been duplicated," "an increased number of water-tight compartments," so as to "neutralize the destructive effect of a torpedo," and "the disposition of the armour." Then, at p. 368, he alludes to the gun and torpedo. "As to guns," he says, "many and great improvements have been made, such as increased muzzle velocity, and thereby flatter trajectory, and a proportionate increase in accuracy." There is no doubt about that. Yesterday, in the new 12-in. wire-constructed gun, we got 2,500 ft. velocity with an 850-lb. projectile! nearly double that of 1880; and when you consider that it is the square of the velocity which contributes to the increase of energy, it shows what an enormous increase of *work*—compared with guns of 1880—we have got out of our present guns. As regards torpedoes, the increase in explosive power is treble what it was in 1880, our present torpedoes carrying an explosive charge of 190 lbs., as against 60 lbs. in 1880. The greater speed also, of course, giving greater accuracy. Speaking of the three weapons—the gun, the torpedo, and the ram—the essayist says, p. 371, "To use either of these weapons effectively, continuous practice is of the greatest importance; this is more particularly the case with the gun." I supplement that by saying it is the case with all the weapons we have in use. The great tendency of the day is to introduce complicated and intricate weapons, and, I am sorry to say, the increased necessity of high training has not been realised in the same ratio. Minute knowledge of the power and use of every weapon on board, and the development of all the resources of the ship, is what is really at the bottom of all efficiency. It is no good, indeed the reverse, having a highly complicated machine unless you have the highly trained men at the back of it, and give both officers and men constant practice. Not only does this appertain to guns and torpedoes, but also to the management of the ships and the handling of the fleet. Speaking of smokeless powder, p. 373, the essayist points out that "this will render the possibility of ships being held together, and acting in concert after the first phase of an engagement, and increases the power of an Admiral to control his fleet, thus rendering tactics of

greater importance than before, as, if one fleet got disorganized while the other was intact, the latter would score an immense advantage." That only emphasizes the point I have been speaking of above, that constant practice is necessary. Then he speaks, p. 374, of effective gunfire range, and says that "when the range and bearing is rapidly altering it would be better to reserve gunfire until within 2,000 yds., to ensure a useful expenditure of ammunition. Different opinions are naturally held on this subject, some gunnery advocates recommending a 4,000-yd. range, while others prefer the shorter range." As far as my opinion goes, I am in favour of a short range for opening fire. I do not think I would go, except on special occasions, much beyond 3,000 yds., but 2,000 would be better. Then he says, p. 375, "an action might be commenced with common shell." As regards the secondary battery and small guns, I quite concur, but consider the heavy guns should be loaded with A.P. projectiles. You cannot predict *where* you are going to hit, and a large portion of the modern ship is unarmoured. As regards "preparations for action," he says, p. 375, "on war being declared, all preparations should be made, as far as possible, so that on sighting the enemy, and the action bugle being sounded, there ought to be little more to do than to clear away and load the guns." I do not quite agree in that, we must *always* be ready; at night time the men must sleep at the guns, which will be loaded, and the anti-torpedo-boat guns ready to be fired at a moment's notice. At p. 375 the essayist speaks of "the importance of the ships of a fleet being able to distinguish between each other and their opponents;" that goes without saying, and I am not aware that any very good system has been adopted to carry out this object either by day or night, excepting the private signals which are scarcely applicable to fast moving boats. The essayist speaks of "colours on a spar or mast, placed as far forward as the guns will allow," as one means, but anything of that nature we could adopt is so likely to be known to the enemy that it would defeat itself. Then, at p. 393, I come to the pith of the whole essay; it is a matter on which I give my opinion with some diffidence. The essayist says, "Before a fleet action can be considered, there are several subjects that require discussion, which may be summarized as follows:—1. How the battle-ships should be organized, also whether the cruisers and torpedo-boat destroyers should be organized separately." I should say that the battle-ships should be organized in divisions (the sub-divisions, or groups, being composed of three ships), and that the torpedo-boat destroyers—two, if available—should be attached to each battle-ship—their parent ship—and that the cruisers should be organized separately with a view to acting independently as scouts and look-outs. A reserve division of battle-ships is indispensable. Then "2. If sea-going torpedo-boats are available, and sent with a fleet, how shall they be organized so as not to hinder the fleet?" I cannot say I agree with the essayist in his answer to that. He puts it in this way, he says, "great use may be made of them, and if engaging a fleet coming straight from harbour with its attendant boats, their value would soon be recognised. Therefore their organization should be entirely separate from that of the fleet." I do not agree with that; the prevailing idea in the organization of a fleet is to keep every unit in hand. With "the boats being under the senior officer, who again is under the captain of the cruiser," I do not agree; I think the sea-going torpedo-boats (if ever attached to a fleet?) should be attendant on and attached to their parent ship—whether battle-ship or cruiser. The torpedo-boat destroyers, or larger torpedo-boat, only should accompany a sea-going fleet, and if detached should work in pairs. Then "3. What formation should the fleet adopt, and is it to depend on that of the enemy?" I should say sub-divisions (of three ships) in quarter-line, in line ahead at manning distance, with the reserve division well to the rear. This appears to be the best offensive and defensive formation, besides being flexible; but this will be an open question till tested by the experience of war. Then "4. Position of cruisers and torpedo-boat destroyers in an engagement." I think cruisers, when called in after sighting the enemy, and ascertaining his strength and formation, should form with the reserve. Torpedo-boat destroyers of each sub-division should proceed, during the day, astern of the leading ship of the sub-division, during the night on both bows. Then "6. Position of the Commander-in-Chief." I should say certainly he ought to be ahead in the leading sub-division. "7. Which is to be considered the principal weapon to which the

tactics are, if necessary, to be subordinated?" My opinion is with the adoption of submarine torpedo and smokeless powder. The gun is the first weapon we should use. Then "8. What speed is to be adopted?" My answer is the ordinary speed of the slowest vessel. "9. General method of commencing an engagement." It should be with the gun first from about 3,000 to 1,000 yds. range. Then, lastly, "10. Possibility of signals being visible after the engagement has commenced." The least amount of signalling the better, the Commander-in-Chief having arranged every possible combination with the captains beforehand. One point I would ask the essayist. Many of the ships have got torpedo-boats on board, what would he propose to do with these boats in action; leave them to be destroyed on the booms or hoist them out? There is a clerical error, I think, on p. 398, the essayist says, "when at rather over 2 miles (4,400 yds.)," that must be 4,000 yds. It is a material point as regards the time available for manœuvring, which the essayist proposes. The respective fleet going 12 knots, I should consider it a very dangerous thing to attempt to manœuvre under the bows of the enemy! Is it a wise thing to manœuvre when you are in sight of and closing your enemy? Then at p. 403 the essayist says, "we will possess two fleets of modern ships, a reserve one of not quite such modern ones, and a still further reserve of all the older vessels; these vessels will be principally required to fill up gaps in the fighting line after an engagement." There cannot be a question about the value of a reserve; we must all be agreed upon that. In these days you must have a reserve, not only of ships but of squadrons and divisions; it is a well understood rule. On p. 410 the essayist says, "Fire discipline is of immense importance, particularly against this form of attack (torpedo-boat). It is necessary for the officers of the quarters to have a clear idea of the position of the other ships." That goes without saying. "The barbette or turret guns should not be used, but the large quick-firing guns with smokeless powder will be effective," and, of course, the small guns would be told off specially to destroy torpedo-boats. The last point on which I should like to lay stress is on p. 412, where the essayist speaks of "the increasing importance of tactical training for all executive officers in view of the great activity which is being displayed by all maritime nations in their navies, not only in increasing the number and strength of their ships, but also in the improved training of their officers and men." I most heartily concur in that. I will not trouble you with any further remarks, but will only express my obligation to Commander Sturdee for having written this lecture, and congratulate him on this being the second time that he has received the Gold Medal of this Institution.

Vice-Admiral P. H. COLOMB: I think, sir, the difficulty we meet here in our naval discussions is that of collecting a sufficient number of the younger officers, in direct touch with the thought of the navy, and so the discussions fall more than they should into hands like my own, hands which are getting a little crippled from age, and a mind which cannot possibly be in touch with the most modern ideas afloat. I am afraid it is inherent in the nature of things, at any rate while the navy is much under-officered as it is at present, that our discussions of naval subjects should fall into such hands as my own, and all that anybody like myself can do is his best, and hope that his best, bad as it may be, helps, be it ever so little. The subject is a hard one to discuss at all. First of all, it is enormously wide, and then the different points relating to one another are more or less in a state of flux, so that it is hard indeed to pick out any point in the tactical question and say, "We are going to start from that point, and we can make certain extensions from it because we have that one point clear to begin with and study." Now, from the remarks of the Prize Essayist, and of Mr. Calthorpe, and from Admiral Cleveland's remarks, we can see in what a state of flux the whole question is. I am bound to say that I think both essayists have touched the subject with admirable skill. They have not dogmatised; as a rule, they have put forward the opposite sides of the question, dwelling, as they ought to dwell, with greater weight on that side of it which has their favour, but not forcing any side forward; and that appears to me to be the proper attitude to take up in a subject of this kind, which must be, I am afraid, for many years to come, so very speculative. As we know, it is so speculative in parts that a great many leading officers decline to entertain the possibility of arriving at conclusions. It is commonly held that until war comes we

cannot tell how things are going to be. I was, as you know, in times gone by, very much mixed up in the whole subject, and I have at home now a very big book, complete in manuscript, which was written a good many years ago, which never saw the light, and never will see the light, because of its being, when one looks upon it, so full of speculation—so useless, from the practical point of view, for want of facts. The only use part of it has been was that it suggested and helped, I hope, the Committee of the last revision of signals—the manœuvring part—but the attack and defence part is speculative, and as a speculation is not very much good. Knowing, as I do, therefore, the difficulty of treating the whole subject, even at very great length, and when you have plenty of foolscap, of pens and ink, and of time at your disposal I more admire the way in which the Prize Essayist has dealt with the subject, his clearness, and his wise moderation and care. The feeling against theory is strong, and rightly strong, in the navy. It has happened with foreign books on tactics that they have been unfortunately more speculative than there was any necessity for, and therefore, I think, that for some time that fact created in our minds here a prejudice against going into the subject of naval tactics. What we want undoubtedly is more and more reliable experiment. We should be struck at the outset of a discussion of this kind with the title of the paper. We are going to discuss how to fight the existing ships and weapons as if we said that the existing ships and weapons had not been prepared for fighting, but for something else; and having got them, we were to discover how best to use them for the fighting which had not been contemplated. There is something of this in the title, no doubt. The types of ships have grown up greatly apart from the tactical question. The battle-ships are not built as the old line-of-battle ships were built, in order to be "fit to lie in a line," therefore their types are continually varying, and varying types presuppose no uniform system. One point that is new since I left the Service, and that strikes me very forcibly, is that apparent conversion of the battle-ship, the cruiser, and the torpedo-boat destroyer into a fighting unit. Our forefathers dreamt of nothing of that sort. They held that the battle-ship was the be-all and the end-all; she was a ship that stood alone, and nothing but a battle-ship was her match. Now we have the Prize Essayist saying, I suppose and I believe with the concurrence of the naval mind all over the world, that it is necessary for our modern battle-ships to have attached to them a torpedo-boat destroyer in order to protect them; and if we think what a very odd situation that is, we cannot help being struck by it. Fancy our forefathers in line-of-battle ships demanding some other class of ship to protect them! The new suggestion seems to me to strike a very strong and curious note. Whether, supposing such things are necessary, a modern British fleet would be able to have them seems to me a different question. We know that in times gone by, however much the frigates were desired to attend the fleet, they could not be had. And why? Because their other duties were higher and more pressing. And I cannot help feeling that the duties of the cruisers and torpedo-boat destroyers in blocking harbours and guarding trade will take them away, so that in no case can they be found in such profusion attached to a fleet as the essayist seems to expect. I have myself the greatest difficulty in understanding what the real place of the battle-ship is now, if it is the case that she is unfit to go alone, if she cannot go on without her attendant torpedo-boat destroyer. In the whole conception of naval tactics our ideas have been upset, in the first instance, by the advent of the ram. The advent of the ram, no doubt, gave to the naval mind all over the world the idea of the end-on position, and without enquiring very much further, and simply taking the thought that the ram necessitated at some period an end-on position, we proceeded to strengthen the gun-fire forward, and have gone on at it ever since. That was a tactical conception, a conception that we should want that kind of armament, and of course it is no more than a conception. It may have been a right or a wrong conception. We might reverse the practice without any one being, as one might say, the wiser. We might drop the bow fire altogether; we might strengthen the stern fire. It is quite possible that an opinion to that effect might grow up, and if an opinion did grow up the thing would be done. The essayist struck, I think, a blow at that whole conception, because if the end-on position depends upon the ram, and if it is necessary, because of the ram, to greatly strengthen the bow fire, then we weaken

the whole position when we do, as both essayists seem to do, weaken the ram. The essayists seem rather to throw the ram on one side, not as a main weapon, but a subsidiary weapon, which is to come in after the main business is done as a sort of finishing stroke. But the torpedo, inasmuch as it has given immense power to very small displacement, does not stand in the category of the ram, side by side with the ram, in any system of naval tactics. If the torpedo had confined itself to being another weapon put into the battle-ship we should not have had much change, but when we find the essayist discussing both sides of the question as to how far the torpedo-boat, or, of course, the torpedo-boat destroyer, for it comes to the same thing, is to be the match of the line-of-battle ships, we open a tremendously wide field for speculation. We are again recalled to consider, what is the real place of the modern battle-ship? Both the essayists speak in rather doubtful terms as to how far the pure torpedo attack might succeed as against a battle fleet. The Prize Essayist discusses in what, to my mind, is the most important part of his paper—the latter part of it—this very question of how torpedo-vessels alone are to attack the battle fleet, and he puts the ships of the battle fleet in the position of making the best defence they can by turning their quarters to the approaching flotilla of torpedo-vessels and keeping them under fire for a considerable time. That is a position we are all agreed about. We have always thought that that must be the defence in the open sea against a torpedo attack; but what we see around us now must shake us to some extent, because the speed which has been given to the torpedo-vessel has become so excessive over that which the battle-ship can produce that this hope of keeping the torpedo-boat long under fire is, at any rate, weaker than it was. It is commonly said, and we have been accustomed to think, that practically the torpedo attack is a thing for evasion, a night business, a thing which cannot be done boldly in open day. But from the tone that the essayist takes up, I cannot help thinking that he is not quite clear upon that point, and with the example before us of what happened in Chili, where two torpedo gun-vessels sank a battle-ship with very little damage to themselves, we cannot escape the conviction that it may be that this gun-fire which our battle-ships would offer is not so strong a hedge as we might have been led to expect. In every case where things have not gone quite right as regards the guns we have always been accustomed to say it was bad gunners, as we did in the case of the "Blanco Encalda," as we did at Lissa, and as we have always done. It was the bad shooting of the "Huascar" which prevented her sinking the "Shah." It was the bad shooting of the Italian Fleet which did not stop the Austrian Fleet. It was the bad shooting and altogether unprepared state of the "Blanco Encalda" which enabled the two Chilian torpedo-vessels to sink her. Looking at it from that point of view, we get grave matter for thought as to what this tremendously increasing speed which is being given to vessels practically capable only of using the torpedo with effect means. Will the position of the battle-ship remain as it is if this sort of thing goes on? It is this thought, sir, which strikes me with strongest force in discussing the very able paper which has been put before us.

Captain BLAXLAND: Though I agree almost entirely with the essayist in what he has written, there is a point about single ships attacking one another worth discussing. Two methods have been put down—ship wanting to ram, and ship wanting to attack by artillery fire. Now, if a torpedo is worth anything, it is effective 600 yds. before you can get your ram in; and why should not a cruiser, if it is attacking another cruiser, go straight for the best position of putting her torpedo in with the least risk of having another torpedo put in against her by the enemy? I think that with these modern cruisers that have torpedo positions above water it would be a risky thing to have too long an artillery action in which your torpedo above water might be disabled, and it might therefore become a source of danger to the ship to which you belong to have your torpedoes ready unless you want to use them. Therefore I think, if I was commanding a cruiser, I should make my point of attack the point at which I could bring a torpedo into play with the least risk of having a torpedo from the enemy. I do not think any mention is made of a ship wishing to make a torpedo attack. I think a cruiser is quite able to make a torpedo attack as well as a torpedo-boat, and having torpedoes in an exposed position, the sooner they are got off the better. I wish to put that in because I do not

think it is explained. If the torpedo is the certain weapon it is supposed to be at 600 yds., the same distance in which you used to lay your broadside formerly, it would be effective if you only worked for that position and let the artillery fire cover the position you want to take up.

Captain ANSON: I should like to say a word respecting Admiral Colomb's idea of its being *necessary* for a battle-ship to be accompanied by a torpedo-boat destroyer, and thus recalling to mind what would have been the effect in the old days if a battle-ship had to be protected by a sloop. On the question of units of naval force I am strongly in accord with Admiral Cleveland's remark, if I understood him correctly, that in any future warfare a battle-ship must be accompanied by a cruiser and a torpedo-boat destroyer. The reason is, as far as I can see—and I venture very humbly to give my opinion—that the torpedo itself has altered the whole complexion of naval ideas. The number of assailants makes it necessary for a battle-ship to be protected by some more mobile power than she can exert herself. Another point was made as to what to do with the 2nd class torpedo-boats carried on board battle-ships. I should think there would not be a doubt, if the weather was sufficiently calm, that these boats would be hoisted out before an action was probable. They would then be very useful, possibly in saving life. They might on some occasions lie under the lee of their parent ships. At any rate, they would be better left on shore than subjected to the utter destruction that must be their fate if they remain on the decks of their ships.[1] (Hear, hear.)

Vice-Admiral LINDESAY BRINE: Perhaps I may say a few words with reference to this question, because I was one of those on the Council who brought forward the subject of the essay for this year. What was really wanted was not so much what appears in this essay, as to bring before us some idea of what the officers of the present day commanding ships had made up their minds to with reference to tactics in time of war. When this subject—"The tactics best adapted for developing the power of existing ships"—was chosen for the Naval Prize Essay, it had appeared for some time that foreign nations had, to a certain extent, established the principles of a system of tactics for their fleets, and the ships were so built as to be subordinated to the principles governing these tactics. Taking the French line-of-battle ships as an example, it seemed evident in consequence of the positions in which the guns were placed, in consequence of the strength given to the bow, and in consequence of the great power and strength given to the ship bodily by being surrounded by a strong iron belt, that the intention, as regards tactics of foreign nations, was tending towards a bow attack which might ultimately end in a ramming attack. It was considered important that in the beginning of an action the tactics that were to be executed should be clearly and distinctly understood. Everything depended in a naval battle, not so much how you used torpedoes or guns, or this or that weapon, as that the tactics of the fleet should be strictly carried out, as tactics, and tactics alone, would probably govern the result of an action at sea. It is probable that upon the respective formations of the opposing fleets will depend the movements which will lead to the gain or the loss of the battle. I believe that it is becoming the custom with foreign Admiralties to direct that officers lately commanding fleets or squadrons should, upon their return from sea service, be formed temporarily into a small committee, and their views are taken as regards this question as to the best method of organizing the fleet for immediate action. The result is that the Admiralties abroad become possessed of the best knowledge available, and the opinions of their naval officers lately serving with regard to tactics. Those opinions are recorded, and would be a guide in case of war to the Admirals who were then placed in command. Some of the officers studying at the Royal Naval College were asked a few years ago what were the views generally held as regards the best formation of the fleet for action. It is remarkable that in the English Service the usual opinion appears to be in favour—one or more formations of "line ahead." Groups were considered not to be desirable, because of the

[1] An additional consideration concerning the inadvisability of keeping 2nd class torpedo-boats on board is that they would increase the danger arising from splinters of metal from their being struck by projectiles.

difficulty of altering the formation, and maintaining correct bearings and distances. A disposition of the ships in single lines ahead is considered by some of our Admirals to be the best formation for an English fleet to go into action. I have been informed that the French consider that the most advisable formation for their ironclads is the line abreast. It is supposed that, although the ships passing in lines ahead might cut off the wing ships of the fleet disposed in line abreast, the "line abreast" would cut off the rear ships of the "line ahead." There was, therefore, a danger in our formation of the "line ahead," and, looking at the construction of their ships, there appeared to be an advantage in the French system of attacking in "line abreast." I shall not proceed further with this subject, because it is a very large and important question. I merely rose to point out that the object of the Prize Essay was to obtain the views of officers now serving with regard to their views of the best tactics to be carried out in action. It is to be hoped that some plan will be adopted by which, when war occurs, the Admirals of our fleets would have at hand for their consideration schemes of formations for attack founded upon the judgment of experienced officers, showing what they considered to be the best systems of tactics to be adopted for the purpose of winning an action.

Commander F. C. D. STURDEE: I should like to commence by thanking the meeting and the several speakers for the very kind way they have referred to my essay, and to say that I hope, in any remarks I make, it will be understood that I am not in a position to reply in the way that a more senior officer could, as, naturally, I have not the same authority or experience. The reason I competed a second time was because for some years I have taken a great interest in tactics, and have been continually trying to find out the best tactics to adopt. It seems necessary for officers to get their ideas formed, and one cannot commence too young, trying to arrive at some conclusions, and modifying them according to circumstances. That was my reason, and not from any special experience or opportunities I have had in the way of studying the subject. The first point which Admiral Cleveland remarked on was about the men sleeping at the guns at night. In writing I did not lay down any suggestions for night. Of course, that would be a ship arrangement, and if one is in torpedo-boat waters I do not suppose there would be the slightest doubt but that the men would be at the guns; and they should always be ready in the daytime. I notice he agrees about the effective gun range, but reduces it to 2,000 yds. As to battle-ships being in group formation, my idea was that they should be worked in groups. I did not call them groups but subdivisions. They were to act together for mutual support. I notice his foramtion is different to the one I recommended, and, of course, that is a subject on which he has a great deal more experience than I have. Still I think that the prevailing idea is line ahead. Admiral Cleveland also referred to altering the formation, or manœuvring in the face of the enemy, and to be able to do that was one of the reasons I adopted line ahead. It gives flexibilty, and may offer a chance of out-manœuvring the enemy. If one goes into action, as far as I can see, with a quarter-line or any other formation, one would not dare to manœuvre because it would throw your ships somewhat into confusion. With the line ahead it does not matter, where the head is going the tail has to follow it, and, in case of coming to close quarters, if the leading ship is disabled or rammed the other ships can avoid her more easily. I know there is the objection to line ahead, that it is liable to be broken, but if the fleet has been trained and the officers accustomed to altering course altogether by simple signals, I have no doubt that that can be overcome. As regards the torpedo-boats being attached to ships, I think it is problematical whether one would have torpedo-boats at all with the fleet, but there are certain cases when I think they would be invaluable; but I should not care about hampering the fleet in any way, and that is why I chose a separate organization. If one has torpedo-boats of about 130 ft. long, they must to a certain extent interfere with a fast fleet going 15 knots. The boats cannot at present maintain 15 knots for a long distance, and therefore they would be a hindrance, and that is the reason I propose their being attached to a cruiser. If one were blockading an enemy's harbour boats would then be invaluable. If there are sufficient destroyers, they no doubt would be ever so much better than the torpedo-boats; the destroyers

will take the place of sea-going torpedo-boats in all fleets. As regards speed, the speed I have put down for the battle-ships is the ordinary speed of the slowest ship, but it should in all cases be as high a speed as possible. Admiral Cleveland asked a question, what is to be done with the torpedo-boats on board? The prime use of these boats is to attack ships in harbour. I do not see that they are of any use in manœuvring with the fleet at sea. The ships would want to go 15 knots; the torpedo-boat maximum speed is only 15, and its ordinary speed in any sea would be about 9. Therefore, if they were hoisted out they would be worse than useless, and they might just as well be destroyed in their crutches as anywhere else. You would waste a certain number of men, and would always be uneasy about them after the engagement. Besides that, you would throw your fleet out of order in the face of the enemy, which seems to me a serious matter, because whatever formation the fleet is cruising in it is probable it would not fight in that order. For instance, if you are cruising in divisions in line ahead and you wanted to get into single column line ahead it takes a certain time, and all the time available is required to do it. I think Admiral Colomb mentioned the question of the battle-ship, and cruiser, and torpedo-boat destroyer. I am afraid it is a position we have been driven to, and cannot help ourselves, and it appears it must be recognised that the torpedo-boat destroyer is a necessity to a battle-ship. Whether we have enough torpedo-boat destroyers to attach to a fleet is a matter of policy. I have no doubt the authorities will see that we have enough to do either work if they consider them necessary, viz., to blockade the enemy's harbours and to protect the merchantmen. But certainly, if there are enough, I think they are indispensable in protecting a fleet in confined waters. And another fact to be remembered, which I think Admiral Colomb himself has often stated, is that most of our battles have been fought by blockading fleets, and the actions have always been near the enemy's shore, therefore the torpedo-boat destroyers which have been blockading the enemy will be available to come and help the battle-ships. As regards "end-on" fire being necessary for a ram, I have no doubt that was the reason it was introduced, and it is, of course, necessary; but it seems to me end-on fire is necessary in any case, because if you do not want to ram the enemy, and he is determined to force you to ram, you have to turn away. If you turn away you show your broadside for a certain time, and then your quarter and even stern, and therefore good stern fire becomes vital. At the same time, while approaching, good bow fire is required. Therefore, I think good end-on fire is nearly as necessary as good broadside fire, and a ship to be efficient must have a good all-round fire, and not one part of her armament sacrificed to increase the other abnormally. As regards the fleet running away from the torpedo-boats, and the increasing speed of the torpedo-boat destroyers, it seems to me the more the speed of the torpedo-boat destroyer is increased the more necessary it is for the fleet to turn away and keep them longer under fire. It becomes a simple arithmetical sum. If the torpedo-boat destroyer approaches at 30 knots an hour, and the fleet are steaming at 15 knots, the speed of approach is 45 knots, and a mile is covered in a little over a minute; so that there is a very short time for the guns to do their work, *i.e.*, to destroy the destroyer. I suppose the only way to do that is to put a shot into one of her boilers. You might damage one of the engines, but they have twin screws, and would still be able to come on. It seems to me there is nothing for a fleet to do but to use its weapons of offence to the best advantage, and to keep the boat under fire as long as possible. The gun is the only weapon of offence. It has a good target in the boat, and if there is only time there is a considerable chance of it being destroyed. Captain Blaxland spoke about the cruiser making a torpedo attack. I quite think the cruiser in many cases would, but, as far as my limited experience goes, I am not prepared to recommend a cruiser approaching a ship like the "Royal Sovereign" with the view of making a torpedo-boat attack in broad daytime. She has a very small chance of getting near her I should imagine. If I was the captain of the cruiser, on meeting such a ship, I should like to draw her towards my own fleet. As a last resort she might turn and try and torpedo her. It is the only chance a cruiser has if it is being overtaken, as I think will be found mentioned in the essay. Admiral Brine did not seem to consider the subject of tactics had been sufficiently dealt with. Of course, one has done one's best to

bring in as much tactics as one can, and I do not quite see how one could have brought in more tactics. I have given the formation of the fleet for attack, and there is a prevailing idea that not much change should take place in view of the enemy, and I have gone so far as to alter the ships' movements a little so as to try and out-manœuvre the different formations of the enemy. There may be some tactical questions I might have dealt with, but I am afraid I did not quite see my way to go any further. As regards the two formations, "line abreast" and "line ahead," there is this danger in the "line ahead," that if you penetrate the enemy's fleet your rear ship may be surrounded; but in the commencement, except the case where he has allowed our fleet to penetrate with apparent advantage, I have tried to avoid that. In fact, have not tried to penetrate theirs; and have started by a gun action, and then, as we have obtained an advantage, have charged their ships, and by that time we may hope their fleet would be more disorganized than our own, or that we can overpower some part of it. Having, I think, replied to the various points I will close my remarks.

The CHAIRMAN (Sir A. H. Hoskins): As no one else rises, it devolves upon me as chairman to perform the duties of a judge, and sum up the different opinions that have been given, with a view to placing them before you gentlemen as the jury. Admiral Brine has, I think, very properly called attention to the fact that the essay deals rather with details than with the general principles of tactics which should be observed or studied with a view to war. I think, however, it is a thing that may be very well carried too far. We all remember that in the last century there were such things as fighting orders for the fleet, and those who are acquainted with those fighting orders and naval history are perfectly well aware that some of our principal actions utterly miscarried through having too precise rules laid down for the conduct of fleets in action. Two instances that rise to my memory at the moment are those of Matthews and Lestock in the Mediterranean, and Rodney's first encounter with the French Fleet in the West Indies. I think, therefore, it would be very undesirable indeed that the Admiralty, as I think Admiral Brine suggested, should lay down any positive rules or carry too far an investigation of how the tactics of a fleet should be carried out in the presence of an enemy. It is a thing which the Commander-in-Chief must arrive at from his own experience, having very closely and laboriously thought it out for himself, and, as Marshal Pelissier said with reference to the contemplated attack on the "Malakhoff," never confided it even to his own pillow. It is a thing that would be most dangerous to get out and to be known to an enemy, and it would be sure to be talked about as the authoritative view of a responsible officer. But, I think the details that the essayist has given us are very praiseworthy and valuable indeed, and I think that they cannot be too carefully studied even by Admirals who may possibly be in command. They deal with a great many points which a man does not want to reason out at the moment of collision, but that he wants to have at his finger's ends, to be thoroughly imbued with so as to be able to act upon them without thought. It reminds me very much of what we used to do—many will remember it in their midshipmen days—walking up and down the deck in the middle watch and thinking what they should do if a man fell overboard, or in certain emergencies which might arise, and by that constant thought of these things we were generally ready when the time came to act. But it is impossible that all the contingencies can be provided for which will govern the action of a fleet. The conditions of weather, the conditions of the ship, the enemy you may have to meet, the locality, &c., all enter into the consideration, and the Admiral himself only can at the moment say what is the proper course to pursue. At one time there was considerable discussion about torpedo-boats and their uses, and their being attached to battle-ships and so on. I myself think no absolute rule can possibly be laid down that can be followed under all the varying circumstances, and as the Admiral at the moment has a large and comprehensive view of the situation, which, of course, he must have to be fit for his post, he must decide at the time what the arrangements should be, and how he must fight. Then again there is another point which has been somewhat commented on, and that is the preservation of your formation in action. It is very important, but is it possible—after the first collision between two fleets, supposing them to come into close contact—is it

possible to keep your formation? My own impression is that it is not—that it is absolutely impossible. With ships sinking possibly, ships damaged, helms shot away, the look-out houses injured or the officers in them blinded—it is absolutely impossible when fleets actually come into collision that any accurate formation can be preserved. And now I come to the point which I think is all-important, and that is that the Admiral, when war is imminent or when it has been declared, should have the closest consultation with the captains under him, that they should become so thoroughly indoctrinated with his views that they should know under all circumstances the general lines that he wishes to carry out, and that they should be enabled to do their part in it with little reference, if possible without any reference, to him during the rest of the action or during the conflict with the enemy. We have the greatest example of this in Nelson. We all know that nothing was more remarkable in his character than the way in which all his captains thoroughly understood his views and the way he intended to carry his fleet into action under all possible circumstances, and he scarcely ever made a signal after the action was commenced. Take the Nile. The question has been asked where the Admiral should be. In two of Nelson's actions at least he was in the centre. At Trafalgar he was at the head. I do not think you can lay down an arbitrary rule about that, but at the Nile he was in the centre. The first division—the leading division—I believe it is a disputed question to this day whether by orders or not, but at all events they pushed inside the French Fleet and anchored inside, which it was his intention that one of the divisions should do, but not necessarily the leading one; but, being in the centre of the fleet, he saw what the leading squadron had done, and then he doubled on the French Fleet according to his predetermined plan on the outside. At Trafalgar he was leading one division himself—the port division. It is a very remarkable fact, if you study the excellent account of Trafalgar written by Professor Laughton, you will see the English Fleet was in no order whatever. There was a "general idea" order. The ships were in two columns roughly, but if you study the plan of action just as the fleets came into contact with the enemy, the English Fleet was apparently in the most utter disorder. But every captain knew perfectly well what was expected of him, what he was going to do, and how he was going to double over the rear of the combined fleet to overwhelm and smash them. It is quite worth studying the diagram of that action just before it commenced—the diagram of the position of the fleet with a view to that fact. It may be wandering a little from the subject, but there was a very interesting fact connected with the Battle of the Nile and Sir James Saumarez's part in that. I mention this *à propos* of naval tactics. He had been at the Nile, and had seen the entire success which attended the tactics adopted by Nelson there. I have no doubt myself, in reading the naval history of those days, that when some little time afterwards, not very long afterwards, he found himself in command of a squadron to attack Linois at anchor at Algeciras, that he was so possessed with the idea that he endeavoured to repeat the same tactics; but the conditions being somewhat altered and not favourable to his design, and Linois also having profited by experience, and taken precautionary measures to prevent the carrying out of that plan, it failed utterly; he lost a ship, and had to retire to Gibraltar to refit. Again, another very curious thing is that sometime afterwards in the battle he had the opportunity of practising the same manœuvre on the Russian Fleet, we then being at war with Russia; but I have no doubt, warned by his experience at Algeciras, he did not go in and attack the Russian Fleet at anchor as he might have done and ought to have done, but he laid off and waited for the Swedes to join him, and he postponed the action till he lost all chance of doing it. The Russians took the necessary precautions, and saved their fleet from the attack. It only shows how entirely naval tactics must depend on the Admiral in command at the moment, on his having a grasp of the situation, and on his perfect accord with his captains. I think I will say no more, but in the name of this meeting I will tender our thanks to the essayist for the admirable essay he has given us. I should also like to mention favourably the essay which has received honourable mention—that of Lieutenant Somerset Calthorpe.

FOREIGN SECTION.

THE CAMPAIGNS OF SAXE.

By Lieut.-Colonel E. M. Lloyd, late R.E.

A century ago Count Grimoard supplemented Espagnac's life of Saxe by five volumes of his correspondence from papers in the French War Office, but within the last few years a good deal of fresh material for his history has been gleaned from the same source. Count Pajol has given a detailed account of his campaigns in his comprehensive history of the wars of Louis XV; and the Duke de Broglie, in his "Études Diplomatiques" on the Ministry of d'Argenson, has found the figure of Saxe so prominent that, in reprinting them, he has placed his name on the title page. These researches, together with what has been drawn from the Dresden archives, throw much fresh light on Saxe's conduct as a General, and help us to understand not only what he did, but why he did it, when he was commanding the French Army in the Netherlands.

Unfortunately French writers, not wholly from their own fault, are apt to look at those campaigns too exclusively from one side, and to borrow one from another inexact statements of the movements, strength, and losses of the Allied Army. It is true the facts have never been brought together in a complete and convenient form, for no Napier has felt inspired to write the history of the Duke of Cumberland or Prince Charles of Lorraine. But if scattered, they are not out of reach; and in particular the despatches of Cumberland, Ligonier, and others, which fill several volumes of the Foreign Office Records (now in the Public Record Office), ought certainly not to have been neglected, as they seem to have been hitherto.[1]

The two great wars of Louis XV, each of them seven years long, are reckoned to have cost France nearly a hundred millions of money, and two-thirds of a million of men, besides the loss of her navy and her colonies. She employed from 300,000 to 400,000 troops, and tried many commanders in turn. But the operations of the army in

[1] They are catalogued under Military Auxiliary Expeditions. I have to thank Mr. Salisbury of the Public Record Office for directing me to them.

"Histoire de Maurice, Comte de Saxe," by Baron d'Espagnac. 2 vols. Paris. 1775.

"Lettres et Mémoires du Maréchal de Saxe" [Grimoard]. 5 vols. Paris. 1794.

"Les Guerres sous Louis XV," by General Count Pajol. 7 vols. Paris. 1881-91.

"Maurice de Saxe et le Marquis d'Argenson," by the Duke de Broglie. 2 vols. Paris. 1893.

the Netherlands from 1744 to 1748 form the only chapter of those wars to which Frenchmen now look back with pride, and the secret of their success lay in the man who directed them. The last of the great soldiers of fortune, Saxe, fought no battle that he did not win, and failed in no siege that he undertook. In two years he completed the conquest of the Austrian Netherlands, which Luxemburg, half a century before, had not half accomplished in five years.

It may be said that his task was made easy by his superiority of numbers and by the incompetence of the Generals opposed to him. But the superiority of numbers was not invariable; the sieges he had to provide for often equalised the field armies. And, as he himself wrote: "It is not large armies that win battles; it is good ones."

How far the French Army (excepting the siege corps) fell short of being a good one in the reign of Louis XV has been shown by M. Rousset in his admirable biography, "Le Comte de Gisors." Money, favouritism, and backstairs influence had sapped its discipline. It was an instrument which Saxe himself felt it necessary to use with caution, and which failed ignominiously in other hands.

As regards the quality of his antagonists, they were far enough from showing military genius, but their failure was due not so much to individual incompetence as to the disunion and slowness which nearly always characterize an army of allies. But even here the odds were not so much in Saxe's favour as would appear at first sight. A foreigner and a Protestant, he was especially exposed to the carping and malicious spirit which fastened upon every commander of French armies. He had frequently the embarrassment of the King's presence; and he had princes and counts of Royal blood serving with him or under him who fretted at subordination to a "foreign bastard," and measured the strategy of a campaign by the opportunities of distinction it afforded them. These princes were in intimate correspondence with Madame de Pompadour, and she again was in close relations with the two brothers, Paris du Verney and Paris de Montmartel, who—one as Intendant-General of the Army, and the other as banker to the Treasury—had unprecedented influence behind the scenes in military affairs. Hence Saxe was far from having an absolutely free hand as Commander of his army, and such freedom as he had was won by his own force of character, dexterity, and invariable success.

When he reached this position he was 48 years of age, and had been 24 years in the French Service. As a boy he had been present at Malplaquet, in the Allied Army, and he had served a good apprenticeship to the soldier's trade under his father, Augustus II, in Poland, and under Prince Eugene against the Turks. He inherited the singular bodily strength and the genial temper of his father. Like him, he was greedy, wasteful, and dissolute, but he had much more practical ability. His most marked characteristics were an astute *bonhomie* and a devouring activity, whether in business or pleasure. "Want of employment will be the ruin of the reputation and character of Count Saxe; he cannot remain in such a position without even

discrediting the King";[1] so wrote his mother, Aurora von Königsmarck, to Flemming, the Saxon Premier, unfriendly as she knew him to be both to herself and her son. There was no employment for him in Saxony, so he was sent off to Paris, where the Regent received him well, made him *maréchal de camp*, and allowed him to buy the colonelcy of a regiment of German infantry.

In spite of the dissipations of Paris, and the even stronger attractions of the Duchy of Courland, he found time to study the art of war seriously, and to practise new exercises and evolutions with his men. Folard, a high authority in tactics, wrote in 1725: "The troops ought to be trained in musketry according to the method which Count Saxe has introduced in his regiment, a method of which I think very highly, as I do also of its inventor, whose military talent is among the finest I have known; and the next war will show that I am not mistaken in so thinking."[2]

During a fortnight's illness in 1732 he beguiled the time by writing out his ideas on military topics. These "Rêveries" range from the clothing and arming of troops to tactics, strategy, fortification, and food supply. He made some additions to them later, and they were published seven years after his death.[3] Apart from their own value, as the product of a most original and inventive mind, they are an interesting commentary on his subsequent practice.

In the war of the Polish succession, which broke out in 1733, Saxe served with the French Army on the Rhine, although Stanislaus, the candidate supported by France, was the rival of his own half-brother, Augustus III. He distinguished himself in the operations by which Prince Eugene was forced to abandon the lines of Esslingen in 1734, and he took care that his merits should not be overlooked. "Though achievements tell their own tale [he wrote to Noailles, his immediate commander] I find myself obliged in this case to praise myself. I have neither relations nor friends at Court, and false modesty degenerates into stupidity. . . . It is now 14 years that I have had the honour to serve the King as *maréchal de camp*; I am near 40, and I am not of the sort to be subject to rules, and to grow old before reaching high rank." He was made lieutenant-general a few months afterwards.

In 1741 came the war of the Austrian Succession. Saxe commanded the leading column of the army sent into Bohemia under Belleisle, and his capture of Prague by escalade is a memorable example of skill and audacity combined. He did not remain there to undergo the hardships of the long blockade. He was sent to besiege Egra, which threatened the French line of communications, and he took it in less than a fortnight, though his own force was little stronger than the besieged, and (as he reminded a correspondent) it

[1] Taillandier: "Maurice de Saxe," p. 46.

[2] *Id.*, p. 67.

[3] There are two MS. copies of this work at Dresden, one which seems to have been made in 1733, and which does not contain the three last articles; the other, probably made in 1740, in which these articles have been added. (Vitzthum: "Maurice, Comte de Saxe, et Marie-Josephe de Saxe," p. 341, &c.)

had detained Gustavus Adolphus for a month with an army of 22,000 men. After a hasty visit to Russia in pursuit of his will-o'-the-wisp, the Duchy of Courland, he was given the command of a French corps in Bavaria. This corps was soon merged in the army of Westphalia, commanded at first by Maillebois and afterwards by Broglie; but to the great indignation of Saxe, they did nothing to deliver the army of Prague.

In 1743 he served on the Rhine under Noailles, who was always a staunch friend to him, and tried to obtain for him the command of the army of Alsace. The King, however, gave it to Marshal Coigny. "I will grant [he said] that Count Saxe may be the most capable officer we have, but are we to entrust the defence of a province which they are bent on taking from us at any price, and which has been so recently separated from the Empire, solely to him, a man who is a Huguenot, who wants to be a Sovereign Prince, and who is always saying if one thwarts him that he will go into some other service? . . . . Perhaps in time we shall be more sure of him, and I beg you to make it your chief business to bring this about, for indeed I see hardly any of our people who have such breadth of view as he."[1]

These objections did not apply to an adventurous enterprise like the invasion of England. Saxe was clearly marked out for such a service, and he was appointed to command the expedition in support of the Pretender which mustered at Dunkirk in February, 1744. Fortunately perhaps for him, the winds and Admiral Norris caused the abandonment of this project, and he was employed in Flanders instead. On April 6 he was made Marshal, in spite of his Lutheranism, to which he held—lightly indeed, yet tenaciously—throughout his life.

The first three years of the war had shown France how much was to be lost, and how little gained, by operations at a great distance from her own frontier. Louis would have been glad enough now to put an end to a war so wantonly entered into and so disappointing in its results; but he found it must be continued in self-defence. England and Holland had joined in it as auxiliaries of Maria Theresa, and there was no longer any reason for abstaining from an invasion of the Austrian Netherlands.[2] This offered the best prospect of success to the French arms, and was at the same time most congenial to the King, who wished to share personally in the glories without the discomforts of war.

1744.

Two armies were formed near Lille. One of about 50,000 men, under Noailles, was to besiege the fortresses of "the barrier," several of which were garrisoned by Dutch troops, under the terms of the Treaty of Utrecht; the other army, about 30,000 men, under Saxe, was to cover the sieges. Operations began in the middle of May

[1] Rousset: "Correspondance de Louis XV et du Maréchal de Noailles," i, 178.

[2] War was formally declared between France and Great Britain in the spring of 1744, but Holland remained an auxiliary to the end.

with the siege of Menin. That place, Ypres, Knocke, and Furnes were all taken within two months, for they were ill found and feebly defended. During this time the army of Saxe was encamped on the right bank of the Lys, near Courtrai, watching the Allies, who, in the beginning of June, advanced from Brussels to Oudenarde, but there remained passive.

In the middle of July came the unlooked-for news that Prince Charles of Lorraine, with 60,000 Austrian troops, was in Alsace. Noailles hurried off to the Rhine, followed by the King, and Saxe was left with about 45,000 men to make head against the Allies in Flanders. Their effective strength, at first only 40,000, rose by the end of July to 55,000, and by the middle of August to 65,000.[1] But the English commander, Field-Marshal Wade, was over 70 years of age, and afraid of responsibility; and he did not work well with the Austrian General, d'Aremberg, whose chief concern was to cover Brussels and spare the resources of the Netherlands.

Saxe crossed to the left bank of the Lys, so as to have the river in his front, and intrenched himself; and, in spite of their superiority, the Allied Generals did not venture to attack him in his camp. They crossed the Scheldt (July 31), marched up the left bank nearly to Tournay, and then entering France approached Lille, hoping to draw him out of his position. But, in spite of urgent letters from the Court, he refused to move, and would not allow the suburbs of Lille to be destroyed to prepare it for defence. The siege train of the Allies was at Ostend, and, placed as he was, he could prevent their bringing it up. His troops lived at the enemy's expense; he sent his cavalry on raids to harass them, and drilled his infantry. The Allies had, in fact, no thought of such an enterprise as the siege of Lille. The only course they could agree upon was to besiege Maubeuge; but the transfer of the siege train from Ostend to Antwerp caused delay, and difficulties arose about the necessary expenditure, of which the Dutch would not, and the Austrians could not, bear their fair share. The summer slipped away in correspondence, and in October the Allies, having effected nothing, marched back to the neighbourhood of Ghent, and separated to their several quarters. Saxe then broke up his camp, and returned to Paris.

1745.

The renewal of war between Frederic and Maria Theresa relieved France from pressure on the Rhine, and in 1745 the interrupted conquest of the Netherlands was again taken in hand. A field army of 76,000 men, with 100 field guns, was assembled at Valenciennes in April, under the command of Saxe, though he was at that time so ill with dropsy that repeated operations were necessary, and the British Government were told, "his death is daily expected."[2]

[1] These figures are based on "an authentic narrative of the campaign in Flanders of the year 1744," a MS. in the library of the R.U.S. Institution, apparently written by or on behalf of Field-Marshal Wade.

[2] Cumberland to Harrington, April 23 (F. O. Papers).

After a feint at Mons, he invested Tournay. The siege began May 1, on the west side of the town; in the absence of a covering army it could not be attacked on more sides than one. The operations were soon interrupted by the approach of the Allies. As usual, they were late in taking the field, and their strength fell short of what had been agreed upon. There were 22,000 Dutch, a number much below the contingent promised; 2,000 Austrian cavalry, the rest of the Austrian troops having been sent to the Rhine or into garrison; 8,000 Hanoverians, and 21,000 British, making a total of 53,000 men. The Dutch were under the Prince of Waldeck. The Austrian commander was Marshal Königsegg, a veteran of 75, who had served under Prince Eugene, and had led Imperialist armies both against the French in Italy and against the Turks. The British Government were not inclined to concede the chief command to a foreigner who represented so small a fraction of the whole force, nor to re-employ Wade. They chose the Duke of Cumberland, who was, at all events, free from the faults of old age, and whose high rank would give him some ascendency. He was named Captain-General, as Marlborough had been, and it was agreed that he should be Commander-in-Chief of the whole army. He was now 24 years of age; he was an ardent soldier, and had shown courage and coolness at Dettingen two years before.

The Allied Army assembled at Brussels, and as soon as news came of the investment of Tournay detachments were called in, and the army advanced to raise the siege, passing between Ath and Mons, so as to approach the place from the south-east. On May 8 Cumberland wrote: "I cannot bring myself to believe the enemy will wait for us, notwithstanding it is assured the French King is arrived at Lille, if not at the army. My reasons are, that they might have disputed our passage hither with great advantage of ground, that they have withdrawn their baggage over the Scheldt, and that they have not thrown up earth to form a circumvallation. However, I cannot say that everyone is of my opinion that the enemy will retire. I cannot come at any certain knowledge of the enemy's number; but I have concurring information that the body on this side the Scheldt does not exceed 31 battalions or 32 squadrons."[1] The next day's march brought the army to Vézon and Maubray, and they found the French army in their front, encamped behind the village of Fontenoy.

Leaving 18,000 men before Tournay, and 6,000 to guard his bridges and communications, Saxe had brought the rest of his troops to the right bank of the Scheldt. He had more than 10 miles of country to cover, for Tournay might be approached either from Mons, Ath, or Oudenarde; but the movements of the Allies led him to expect the attack from the direction of Mons, and it was on this side that he placed the bulk of his force, between the Scheldt at Antoing and the high road to Ath. His line ran east for rather more than a mile, from the river to Fontenoy, and then turned north at a right angle. The town of Antoing and the village of Fontenoy were entrenched, the western end of the wood of Barry (half a mile to the

[1] To Harrington, from Moulbaix (near Ath) (F. O. Papers).

north of Fontenoy) was cut down, and abatis formed. The hollow road from Antoing to Fontenoy, and that from Fontenoy to the wood, formed something of an obstacle along the front of the position; but, to bar the interval between Antoing and Fontenoy more securely, three redoubts were made near the latter. Two redoubts were also made at the inner end of the wood.

The works were not yet finished when the Allies came up on the evening of May 9. They had been 10 days on the road from Brussels, a distance of only 50 miles, and they were equally leisurely in making their attack. Beyond driving in the French outposts, to allow of a close reconnaissance of the position, they did nothing during the 10th. They waited for their artillery to come up, and prepared for a battle next day, not even making a feint against the more northerly positions of the French. By this course they threw away their advantage of the initiative. Confirmed as to the direction of the attack, Saxe on the night of the 10th shifted troops from his centre to his right, and from his left to his centre. The country north of the Ath road was intersected by ravines and morasses, and largely covered with wood, and he knew that the Allies could not reach it now without a wide circuit, which would give him time for fresh dispositions. He left only about 5,000 men therefore in that part, and had about 47,000 available to meet the expected attack, though the whole of this force was not in position on the morning of the 11th. These measures were, as usual, sharply criticised by his own officers. Three-fourths of the army, Espagnac says, were persuaded that there were too many men on the right and centre; that the enemy would make a false attack on the right, and at the same time get possession of the bridges, which were to the north of Tournay; that the siege train would be lost, and the army cut off from Lille. Saxe was hardly able to mount a horse, and it was loudly said that his illness had affected his brain. But the King, who had joined the army on the 8th, wisely refused to interfere with his arrangements.

Nineteen battalions, supported by three regiments of dragoons, were told off for the defence of Antoing and Fontenoy, and the space between them. A corps of light infantry lately raised (Grassins) was posted in the wood of Barry, and a battalion in each of the redoubts behind it. The rest of the troops were drawn up in line behind the wood and the interval of half a mile which separated it from Fontenoy. About 60 field guns were mounted in the redoubts and entrenchments, or distributed along the line, including a battery of six pieces on a knoll upon the left bank of the Scheldt, which flanked Antoing. Besides the bridges for the troops below Tournay, there was a bridge above Tournay, near Calonne, reserved for the use of the King, and covered by a bridge head which was garrisoned by five battalions.[1]

According to Espagnac, "Marshal Saxe at first thought that the enemy would do as he would have done in their place; that they would content themselves with disquieting the French Army by their

[1] See Plate 1, in which the features of the ground are taken from the Belgian Government Survey, and the position of the French troops from the contemporary plan of Beaurain.

artillery fire, and by keeping it in its position they would delay, and perhaps prevent, the capture of Tournay. They were so posted, too, that they would fight with odds in their favour if the French attacked them. This was the wish of Count Königsegg, who commanded the Austrians, but the ardent courage of the Duke of Cumberland and the confidence of the English would take no advice." As a matter of fact, however, there was no difference of opinion among the allied chiefs on this point. Lord Dunmore, who joined the army a few days after the battle, wrote: "It gives me the greatest satisfaction to hear the attack was made in concurrence with the Field-Marshal's opinion, after maturely considering the importance of the place besieged and the probability of success."[1]

The cannonade began on both sides soon after 4 A.M. on the 11th. There was a mist in the early morning, but it cleared off about 6 A.M., and the French then saw the Allies forming their line of battle on the near side of the watercourse which had hitherto divided the two armies—the English and Hanoverians in front of Vézon, the Dutch and Austrians in front of Maubray. Their army consisted of 46 battalions and 79 squadrons, giving a total effective strength of about 30,000 foot and 12,000 horse.[2]

About 9 o'clock the Prince of Waldeck attacked Fontenoy with 12 Dutch battalions and 4 Hanoverian, while the rest of the Dutch advanced upon Antoing. The latter movement was very soon checked by the crossfire of the French guns; and the attack on Fontenoy, although pushed further, was not successful. Saxe had gone to Antoing to watch this engagement. When congratulated on the repulse of the Dutch, he answered: "Tout n'est pas dit, monsieur; allons aux Anglais, ils seront de plus dure digestion."

The interest of the battle hinges upon the attack made by the British and Hanoverian infantry against the French centre, and it is worth while to quote freely from the account given by Sir John (afterwards Lord) Ligonier, who was in command of that infantry, and who, as Cumberland said, "fought like a grenadier, and commanded like a general." . . . . "His Royal Highness ordered the army to march at 2 in the morning, and as he was informed that in front of the village of Vézon, quite close to the wood, there was a fort armed with cannon, which might contain 500 or 600 men, he directed Brigadier Ingoldsby, with four good battalions and three 6-pounders, to attack this fort, sword in hand; while the Prince of Waldeck undertook to attack the village of Fontenoy. General Campbell had orders to extend with 15 squadrons in the plain, from the wood nearly to the village of Fontenoy, to cover the infantry of the right wing, of which H.R.H. had given me the command, during its

[1] To Harrington, May 23 (F. O. Papers). Königsegg himself wrote to the same effect on the day after the battle. (Arneth, Maria Theresia's erste Regierungsjahre, iii, 412).

[2] Ligonier to Harrington, June 7 (F. O. Papers). Königsegg in his report says 48 battalions and 85 squadrons (Arneth, iii, 417). The effective strength of battalions of the Allied Army was reckoned at 650 men at the beginning of a campaign; that of French battalions was only about 500; squadrons on each side were about 150 men.

formation. Sir [James] Campbell having had his leg taken off by a cannon-shot about this time, the arrangement as to his action was not carried out, and I formed the two lines of infantry uncovered, with no other interruption from the enemy than a very brisk and destructive cannonade; but having brought forward, by H.R.H.'s orders, seven 6-pounders to the head of the brigade of Guards, they silenced all the ambulant pieces of the enemy.[1]

"All our army was soon drawn up in order of battle, and I sent word by an aide-de-camp to H.R.H. that if he approved I would march against the enemy as soon as the Prince of Waldeck should march against the village of Fontenoy, as H.R.H. and I had agreed; and this H.R.H. approved. The idea of attacking the fort near the wood was entirely H.R.H.'s, and he had chosen for this enterprise Brigadier Ingoldsby, as a man of whom he had a good opinion, and in whom he had confidence; and I am fully persuaded that if this attack had been made it would have succeeded. However, by some fatality which I do not understand, the brigadier—whom I believe to be a brave and honourable man—did not attack the fort in spite of the reiterated orders of H.R.H. and of mine.

"Our two lines, however, being drawn up in the most beautiful order one can conceive, the cavalry also in two lines behind the infantry, H.R.H., in spite of all that the Marshal could say, and of the representations which I took the liberty of making to him, put himself at our head, and ordered us to march straight at the enemy. The Prince of Waldeck at the same time advanced to attack Fontenoy. In this march the artillery fire was terrible; we reached the enemy, however, and received their discharge at 30 paces without firing a shot. I thought then that victory was certain; our infantry broke through everything that was in front of us, and the enemy were driven back fighting 300 paces beyond the fort and the village, and we were masters of the field of battle as far as their camp.

"But the Dutch, though helped by the fire of our batteries, and supported by two English battalions which H.R.H. sent to threaten Fontenoy on our side, not having succeeded in that attack, and the fort, by a fatality, not having been carried nor attacked, we found ourselves under a cross fire of artillery and musketry, as well as fire from their front, and it was necessary to retire as far as the line between Fontenoy and the fort near the wood, from which there came an incessant fire. H.R.H. and the Marshal were wherever there was the least disorder, and everything was set right in a moment.

"Having had orders to make a second attempt, our troops, animated by the example of the Duke, who insisted, in spite of us, on being at the head of all, a second time made the enemy give way; and they were once more pushed as far as their camp with great loss of men, which we too felt on our side. The Dutch having done nothing during this second attempt, apparently on account of the difficulty of the ground, we found ourselves exposed to the same disadvantages as before, and obliged to retire again to the level of the

[1] *I.e.*, their light 4-pounder battalion guns.

village and the point of the wood. The enemy's cavalry, having tried to penetrate us as we were retiring, were received by our battalions of Guards and by Major-General Zastrow in so handsome a manner that the regiment of Noailles was entirely destroyed, and the Carabineers, as deserters say, had 32 officers killed.

"Things being in this position, H.R.H. and the Marshal, as well as the Prince of Waldeck, came to the conclusion that we must retire, so I sent Howard's Regiment [the Buffs] and the Highlanders [42nd] to occupy the defiles and the cemetery of Vézon; and H.R.H. having drawn up the cavalry to cover the retreat, it was carried out quietly and in good order, the enemy not having made the least attempt to disturb us. It is true we had not the bearing of beaten men, but still it is surprising that they should not have taken a step to follow us up. . . . . .

"It remains for me to say a word about H.R.H., who by a special Providence is in perfect health. The Marshal, surprised at the talent for war which he finds in this Prince, has conceived a particular affection for him. Sound judgment, a coolness rare on occasions where loss of life is one of the least evils to be feared, unequalled intrepidity, the most brilliant and most active valour, are the qualities which I have remarked with astonishment in this young Prince on this day. In fact he has all the qualities which have been ascribed to the great Condé, except ferocity. It is a pity if he do not go far with them, for heaven is not bound to work miracles every day. Under such a chief it is not surprising that our infantry should have performed prodigies of valour. We have lost 6,000 men of the right wing, and the French own to have lost 10,000. We are in need of reinforcements and recruits. From what I can learn, some examples ought to be made in the left wing, but that is no business of ours."[1]

It is a pity that so good a soldier as Ligonier, and a Frenchman withal, should have gone to so absurd a length in praise of his Commander; but Cumberland's courage seems to have outweighed his rashness in general estimation. In a private letter to Horace Walpole it was said: "The Duke's behaviour was, by all accounts, the most heroic and gallant imaginable. . . . . I am convinced his presence and intrepidity greatly contributed to our coming off so well."[2] A letter from the Duke's secretary, Sir Everard Fawkener, notes a failing excusable enough in so young a leader: "It is too much to do as well as direct. There was nothing of that vehement impetuosity for which the late King of Sweden was distinguished in his behaviour, for he saw and examined, and gave his orders with the utmost calmness and precision; but his ardour for the great end he was pursuing carried him to all places where there was anything to be

[1] Ligonier to Harrington, May 14, 1745 (F. O. Papers). The original is in French, unsigned (having been forwarded with another letter), but docketed. The account published by authority in the "London Gazette" was based on this letter, but parts of it were omitted.

[2] Coxe: "History of the Pelham Administration," i, 236. So also Königsegg in writing to the Archduke Francis (Arneth, iii, 413).

done, that he might push the execution of it, and by his example support his orders."[1] Saxe, in his excellent remarks upon the General of an army at the end of the "Rêveries," dwells particularly on this defect of men "who want to do everything, and consequently do nothing."

Ligonier's account of the battle, valuable as it is as an impression at first hand, needs supplementing on several points. The Hanoverian infantry consisted of 5 battalions, one of which was under Ingoldsby. The others took part in the first attack on Fontenoy, and also in the British advance; and it is clear that the latter was not made until after the failure of the former. Simultaneously with the British advance—about 10 o'clock, according to Espagnac—there was a second attack on Fontenoy, the one mentioned by Ligonier, in which two English battalions (the Buffs and the 42nd Highlanders)[2] were engaged, and which failed, as the previous one had done. A third, though perhaps only a demonstration, seems to have been made about noon, when the British made their second advance into the French camp.

Ingoldsby alleged that the Duke's last verbal orders to him were "to keep in a direct line with that part of the army that was on the left," not to attack the redoubt independently beforehand. It is difficult to believe that his brigade could by itself have carried a redoubt garrisoned by a battalion with 4 guns, and supported by another redoubt on its left flank, light troops in its front, and an army in its immediate rear. But the fact remains that, by his own avowal, he did not come within 150 yds. of it, even when the French line had been broken and driven back by the main advance. He was tried by court-martial, and had to resign his commission.

The British and Hanoverian infantry, which advanced in two lines, gradually became what is described sometimes as a "column," sometimes as a "square battalion." How did this come about? Ligonier states[3] that there were not more than 13 battalions, referring, no doubt, to the British only. These, with the 4 Hanoverian battalions, would give a total of about 11,000 effectives,[4] and drawn up as usual three deep, in two lines, they would have a frontage of nearly 1,200 yds. But the author of the "Historical Memoirs of the Duke of Cumberland" (1767) says they were "drawn up very thick," and Voltaire says they were in three lines, each four deep. It seems more probable that the ranks were doubled, and that they were in two lines, each six deep, on account of the cramped space.

This would reduce the frontage to 600 yds. But according to the French this mass of infantry had only a front of 3 battalions, or

[1] To Harrington, May 17 (F. O. Papers).

[2] The Highlanders were drawn from Ingoldsby's brigade.

[3] To Harrington, June 16 (F. O. Papers). There were 20 British battalions in all at Fontenoy; two were with the Dutch, two remained under Ingoldsby, and perhaps three in the reserve under General Moltke.

[4] Or including the one Hanoverian and two British battalions under Ingoldsby, 13,000 men. Voltaire says 14,000. The number given by Sir F. Hamilton ("History of the Grenadier Guards") and others, viz., 16,000, seems much too high.

about 400 yds., as it approached their position. In Stewart's "Sketches of the Highlanders" (i, 275) it is stated: "The ground between the wood and Fontenoy being insufficient for the whole to form in line, the flanks wheeled back on their right and left, and then facing towards their proper front moved forward along with the centre, thus forming the three sides of a hollow square." This explains what took place as regards the Hanoverians on the left flank, who found themselves coming within close fire of Fontenoy: but on the other flank the three battalions of Guards, who were originally on the right of the line, retained their position in front, and the right flank column seems to have been formed by Ingoldsby's brigade tacking itself on to the main force, as shown in the plans of Espagnac's history.

A spur which runs from the wood of Barry towards Fontenoy hid the advance from the French Guards, who were upon the left of the French centre, and when the battalion guns which were being dragged in front appeared on the brow of this spur, their Grenadier companies ran forward to seize them. They fell back on seeing the force of infantry which was close behind the guns. The British passing over the brow descended slowly towards the French, cheering as they advanced, and Lord Charles Hay, commanding the first company of the Grenadier Guards, made the famous address to the French Guards, which (as Carlyle has shown) was in fact "Homeric chaff," but which they understood as an invitation to fire first. Such an invitation would hardly strike them, however, as "a bit of modern chivalry," for it was at that time "a received maxim that those who preserve their fire the longest will be sure to conquer."[1] Though a French officer answered "Nous ne tirons jamais les premiers," they did as a matter of fact open a desultory fire. The British replied by volleys from successive battalions, before which the French Guards and the other regiments of the first line soon broke, taking refuge behind the Barry redoubt and their cavalry, after a loss of over 900 men.

The brigades of the second line of French infantry tried in vain to arrest the British advance; they lost heavily and fell back. The British made no bayonet charge, but their fire discipline was admirable.[2] The rules for successive firings—by platoons, divisions, or grand divisions, or by ranks—so framed that no large part of a battalion should have arms unloaded at any one time, are given in detail by General Bland. When a battalion is to fire advancing, it should move, he says, "as slow as foot can fall," and the several platoons or divisions, each as their turn comes, are to step briskly forward three paces, their front rank kneels, and they fire. Voltaire's account of

[1] Bland: "A Treatise of Military Discipline" (chap. ix, 2). So Saxe himself wrote to d'Argenson (February 25, 1750): "Toute troupe qui a tiré en présence de l'ennemi est une troupe défaite, si celle qui lui est opposée conserve son feu."

[2] Similarly, after Dettingen, Noailles wrote to the King: "The enemy did not advance a step. Their infantry closed up, and stood like a wall of brass; from which issued a fire so brisk and well sustained that the oldest officers declare they never saw the like of it; beyond all comparison superior to ours." (Rousset, i, 123.)

what took place agrees pretty closely with this: "The English delivered a rolling fire, that is to say, they fired by divisions, so that the front of one battalion, four deep,[1] having fired, another battalion delivered its volley, and then a third, while the first reloaded. The line of French infantry did not fire in this way . . . . [The Régiment du Roi is brought up], a battalion of the English Guards leaves the main body, advances a few paces towards it, delivers a most destructive volley, and, stepping short again, takes its place at the head of the column, which continually moves on at a slow pace, never getting into confusion, and repulsing all the regiments which confront it one after the other."[2] The officers, he says, were to be seen placing their canes (or spontoons) on the soldiers' muskets to make them fire low and straight.

It is curious that the French accounts make no mention of the retirement and second advance of the British, as described by Ligonier. In each case the column seems to have halted when 300 yards inside the original French front, where the ground again begins to rise. Cavalry would have completed the work of cutting the French Army in two, but there was no room for them to come up. They had tried to advance between the wood and the hollow way leading past the redoubt to Tournay, but they got into confusion. If the mass of infantry could have opened out to make way for them, or by taking ground to its left could have carried the village of Fontenoy from the rear, the battle would have been won.

Recognising this, Saxe sent regiment after regiment of cavalry to charge it in front or flank. They made no impression upon it, for the horses would not face the "infernal fire;" but they engaged its attention, and hindered its movement or deployment. He saw that so long as Fontenoy was not taken the British had no point of support, their advance exposed them increasingly to fire from flank and rear, and he only required time to re-form his troops for a convergent attack upon them, when this fire should have told sufficiently. The situation was grave enough, however, to lead him to beg the King to recross the Scheldt,[3] and to send orders for the withdrawal of the troops from Antoing, that they might form a rear guard in case of need.

Four guns were brought up and placed so as to bear diagonally upon the head and right flank of the column, while the British guns were now masked by the infantry. After a few rounds had been fired from them,[4] a simultaneous charge was made by the Irish Brigade

[1] The French, not the English, formation.

[2] Précis du Siècle de Louis XV.

[3] So his biographer Espagnac says, who was on his Staff. But the Saxon Minister, writing to Augustus III five days after the battle, says it was Noailles who gave this advice, and Saxe opposed it, telling the King that the situation was not past remedy if he were let alone. (Vitzthum, p. 484.)

[4] These guns no doubt had their effect, but no notice is taken of them in the English accounts. The idea of bringing them up—a sufficiently obvious one in any case—seems to have occurred first to Isnard, an infantry captain; but the Duke of Richelieu managed to secure the credit of it, and Voltaire, an ally of Richelieu, claims that it was he who saved the day. But apart from his connection with

upon the right of the column, by the Carabineers and Household Cavalry upon the front, and by the troops near Fontenoy upon the left. This was about 1 o'clock, after at least three hours' fighting. According to Espagnac, "La colonne Anglaise fut foudroyée et disparut." Voltaire, with more regard to truth, says they quitted the field of battle without tumult or confusion. Saxe was blamed for not pursuing, but his troops were in no condition for it; the allied cavalry had suffered little, and he had effected his purpose. The total loss of the Allies was returned as 7,247, and, according to Voltaire, the French loss was about the same (7,139), but it has been recently given as 5,161.[1] Of the infantry of the Allies, the Dutch lost 1,401 men, or about 10 per cent.; the Hanoverians 1,432, or 44 per cent.; the British 3,662, or 28 per cent. The 23rd and 12th Regiments lost nearly half their men. About 40 guns were taken by the French: they were left on the field for want of horses, "the contractors for the artillery having run off with them so early that they reached Brussels that day."

Saxe had narrowly escaped a great disaster, and he owned afterwards that it was a mistake on his part not to put an additional redoubt on the spur, midway between Fontenoy and the wood. He did not believe that any General would attempt to push through this interval, and perhaps he wished to leave it clear for his own advance upon a broad front. The general ideas which guided him are fully explained in the "Rêveries," written 13 years before. Taking the battle of Malplaquet, his first military experience, as an example of a defensive action, he says: "If, instead of putting the French troops behind bad intrenchments, the three woods on the two sides of the gap had been formed into abatis, and three or more redoubts had been placed in the gap [which was about a mile and a half wide], I believe that matters would have turned out differently. What would the Allies have done? Would they have ventured to attack these redoubts with several brigades in support of them? I think if that had happened they would have come badly out of it; for assuredly they would not have taken them, and they would have lost an immense number of men.

"Attack is what is most congenial to the French nation. So if a General has his doubts about the orderly movement which battles demand, or about the exact discipline of the troops, the only thing to be done is to make opportunities for fighting in detail, and carry out attacks by brigades. . . . . Nothing is so suitable for this purpose as redoubts; you are continually sending up fresh troops to assail the enemy while he is making his own attack. Nothing will distract him so much, or make him so timid; for while he is attacking he is in constant fear for his own flanks, and your own troops engage all the more heartily because they know that their retreat is secure, and that the enemy will not dare to follow them and thrust himself

Richelieu, Voltaire was anxious to show that "Marshal Saxe made the dispositions, the French officers won the victory," for he grudged Fontenoy to a foreigner.

[1] Pajol: "Les Guerres sous Louis XV," iii, p. 386. He gives that of the Allies as 12,000 to 14,000.

between the redoubts. Yet he must either do this or fall back; then you have all your troops in hand behind the redoubts, and this is the opportunity to turn to the utmost account that French impetuosity known and dreaded by all nations, and in all ages."

He instanced the battle of Pultowa, fought in the same year as Malplaquet, where the redoubts made by Peter the Great saved the day for the Russians, although their troops were not of such spirit and quality as to be able to reap the full advantage. He proposed to place the redoubts usually a quarter of a mile apart, though an enemy was not likely to pass between them even if they were a mile apart, when they were armed with artillery.

The letter to d'Argenson, already quoted,[1] throws further light on his opinions upon the handling of French troops, after the experience of Fontenoy and the subsequent campaigns: "I am bound to say that our infantry, though the bravest in Europe, is not fit to stand a charge in a position where it can be attacked by infantry less brave but better drilled, and in more suitable formation[2] for a charge; and the successes we have had in battles can be attributed only to chance, or to the skill our Generals have shown in reducing engagements to sudden dashes, or to affairs of posts, where the mere bravery and obstinacy of the troops usually carry the day, provided the General makes proper dispositions for supporting them."

After illustrating this from his own battles, he goes on: "I do not know whether there are many of our Generals who would venture to undertake to cross an open plain with a body of infantry in face of a strong force of cavalry, and expect to be able to maintain themselves for several hours with 15 or 20 battalions in the midst of an army, as the English did at Fontenoy, without any charge of cavalry throwing them into confusion or making them exhaust their fire."

The characteristics of French soldiers had no doubt something to do with Saxe's preference for cold steel and disparagement of firearms, though this was partly based on his experience in Eastern Europe with ill-disciplined troops. "I have seen whole volleys not kill four men [he wrote]; and I have never seen volleys—nor any one else, I believe—do so much damage as to prevent men advancing and taking their revenge with the bayonet or by fire at close quarters." He preferred plug bayonets to socket bayonets, "for it is no use wishing to do two things at once: I mean, to charge and to stand fast. In the one case fire is necessary; in the other not at all, and yet it is not so easy to prevent it."[3]

[1] Written February 25, 1750, and printed at the end of the Dresden edition of the "Rêveries."

[2] The formation he himself advocated was by half battalions drawn up eight deep, separated by intervals equal to their own front, occupied by the screen of skirmishers which had covered the advance.

[3] The opinion of Frederic the Great, as expressed to the Count of Gisors, was not very different: "To march forward in good alignment and with a good countenance was what won battles; the Prussian fire, which was so much talked of, was the thing for which he himself really cared least, because in an engagement

Elsewhere he says: "You should never fire at infantry in a place where they can get at you, or you at them; but behind hedges, or where a ditch, a stream, a ravine, and such things, separate you from the enemy, then you should know how to deliver a fire so terrible that nothing can stand it." He proposed that the two rear ranks should sling their firearms, and carry pikes to protect the two front ranks; this would make it unnecessary for the front rank to kneel—"a dangerous motion, because the men who are afraid like that position, and one cannot get them up again when one would, and especially because it obliges one to halt."[1]

Fontenoy may have increased his respect for musketry, but it tended to confirm him in another of his views. "I am not in favour of battles [he had written] especially at the beginning of a war; and I am convinced that a skilful General may wage war all his life without being driven to them. There is no method like this for reducing the enemy to an absurdity, and furthering your own interests. You must have frequent engagements, and so to say melt the enemy away; after which he will have to go into hiding."[1] It is surprising to find this aversion to hazard in a man so prone to adventure and high play. But he was not like a Frederic or a Napoleon, who could lose an army and create a new one; nor even like a Villeroi, who could rely on his master's attachment. His first defeat would probably have been his last command. He could trust himself more than he could trust his troops, and he always did his best to avoid the chances of a pitched battle in the open field.

"Never did a conquered army retire with a lower notion of the army that beat them than our right wing did, nor ever was there a victorious army that had a higher idea of a parcel of people they had defeated:" so writes Lord Crawford in his memoirs. But unfortunately the battle had given the right wing an even lower notion of the left. "It has deprived us of the confidence we had in the Dutch troops [wrote Ligonier]. We are quite convinced that if they had chosen to fight in the style of the right, and if the fort had been attacked according to the arrangement made, victory was certain."[2] The Allies fell back in mutual ill humour, and encamped on the Dender, a few miles to the north of Ath, to wait for reinforcements. No further attempt was made to interfere with the siege of Tournay. The town surrendered 21st May, and the citadel a month later. The want of courage and energy in the defence, and the desertion of some officers of the garrison, gave fresh reason for distrust of the Dutch. "There is something very shocking as well as fatal in this wretched behaviour [Cumberland wrote]. At this rate the best fortified places are of little or no use without a superior army in the field, and with one they don't seem at all necessary."[3]

those fine volleys, which gave so much pleasure at drill, were soon out of the question." (Rousset: "Le Comte de Gisors," p. 103.)

[1] "Rêveries."

[2] To Harrington, May 16, 1745 (F. O. Papers). This paragraph of the letter is in French.

[3] To Harrington, 25th June, 1745 (F. O. Papers).

While this siege was going on, opinion was divided in the allied camp as to what was to be done to prevent further French successes. The line of communication of the British lay through Ostend, Ghent, and Oudenarde, and they attached most importance, therefore, to the protection of Flanders. Königsegg agreed with them; but the Dutch commander, Waldeck, whom Cumberland found "a little obstinate and not very deep," laid stress on the southern fortresses, especially Mons, and asked that either the whole army should take up a position to cover that place or the English and Hanoverian troops should contribute half the garrison needed for it, if it was to be left to itself. "Though I affect to be in spirits, and talk of demolishing the French, I shall be contented if we save Brussels and Flanders," Cumberland told Newcastle on 24th May.[1]

The question was not yet settled when the fall of Tournay citadel set free the French Army for further operations. It had been reinforced by 20,000 men from the Rhine, so that Saxe had now nearly 100,000, to which the Allies could oppose only about 50,000, "of which one-half exceeding bad," as Cumberland complained. On 24th June he wrote: "The Prince of Waldeck and I met at the Marshal's, and have formed the first resolution that has been taken since the battle, which is that I should put the 4 complete Austrian battalions that are on their march from Luxemburg into Namur, where the Dutch are to have 6, so that makes 10; in Charleroi there is 1 of the Queen's and 2 Dutch; Mons with 9 Dutch; so that, thank God, all the places are tolerably well garrisoned, and both the Marshal and the Prince of Waldeck have promised me that Flanders shall be first considered in every motion."[2]

But little came of this agreement. On 1st July Saxe advanced to Leuze, and made the Allies believe that he meant to attack them. In deference to Dutch apprehensions, their camp was shifted to Gramont, 12 miles north of Ath, where it was covered by the Dender in front and fortified. At the same time Saxe had caused a force to move from Maubeuge on Mons to draw the attention of the Allies southward; but his real design was to seize Ghent, which he knew to be weakly garrisoned and not easy to defend, and he sent Löwendahl down the Scheldt for this purpose with a force of 16,000 men.

The Hanoverian General Moltke had been detached by Cumberland with 4,000 men to guard against such an attempt, and to reinforce the garrison if it seemed to be threatened. On reaching Melle, about 3 miles below Ghent, on 9th July, his column fell in during a night march with the part of Löwendahl's force which was on the right bank of the Scheldt, and which consisted of three brigades of cavalry and two of infantry. It was a surprise to both sides, and Moltke himself forced his way through with one battalion and some cavalry, but the bulk of his force had to retire to Dendermond, having lost 600 men. Löwendahl took Ghent by surprise the following night.

The allied Generals were now all agreed that it was necessary to

[1] Coxe: "Pelham Administration," i, 238.
[2] Coxe: "Pelham Administration," i, 240.

retreat on Brussels. They intrenched themselves behind the Senne and the Rupel, between Brussels and Antwerp, which became the port of supply from England; and Saxe was left to complete the conquest of Flanders without interruption. Bruges was occupied; Oudenarde and Dendermond made little resistance; and on 13th August the siege of Ostend was begun. It had held out for three years against the Spaniards, but it had been allowed to become "in so bad a condition from the chief defences being quite choked with sand that no garrison could defend it a week."[1] There were seven battalions in it, of which five were British, but it surrendered on 24th August; and Nieuport, the last place remaining in Flanders, on 6th September.

Ath was next invested, and fell after a fortnight's siege (5th October), and with this for the time being Saxe was content. In the middle of October his army, which during the sieges had been between Alost and Brussels, was distributed in winter cantonments round Ghent, with posts along the Dender. The progress of the Highlanders under Charles Edward, who had won the battle of Preston Pans, on 21st September, called urgently for the return of the British troops to England, and, by the end of October, Cumberland, himself, and nearly all the British infantry had embarked. Six thousand Hessians were taken into British pay to replace them; but they also were sent to England in a few months.

Noailles, as the mouthpiece of the Council, had pressed Saxe to take advantage of the opportunity to push his success further, and get possession of Brussels; but he preferred to choose his own time. "The winter season is not so much to be feared for troops as people suppose. I have made several winter campaigns in frightful climates; the men and horses kept well." So he had written in his "Rêveries," and he waited now till frost should have hardened the roads. He made his plans to move at the beginning of the new year, but an unlooked-for thaw obliged him to wait nearly a month longer. He did his utmost to keep his design secret, and to lull the apprehensions which his remaining in the Netherlands might excite, but the Allies were not quite in the dark. A letter of his to a friend in Dresden (dated 9th January) was intercepted in which, after referring to the preparations at Dunkirk for an expedition in aid of Charles Edward, he added in his peculiar orthography: "Dans quelques jours jores mon tour." Secret information also came from Paris that the descent on the English coast was a mere blind, and that the real design was to strike at Brussels.[2]

The Allies, however, were not able to profit by the warning. They had only 36 battalions of infantry, of which 12 were at Antwerp, 12 at Brussels, and 12 distributed in the intervening space with orders to retire—half of them to Antwerp and half to Brussels—if the French should advance in force. These arrangements were ill-advised. Brussels, though the seat of government, and a great

[1] Cumberland to Harrington, 12th June (F. O. Papers).
[2] Dunmore to Harrington, 17th January (F. O. Papers).

depôt of stores, was very weak as a fortress. An accumulation of troops there could not save it, and could only aggravate its loss.

On 28th January four French columns set out from Dendermond, Ghent, Oudenarde, and Ath, without tents or baggage, and three days afterwards they invested Brussels on all sides and occupied the suburbs. Two other columns, from Tournay and Maubeuge, making a total force of 30,000 men, were directed on Wavre and Nivelles, to hold in check any movement of the garrisons of Mons, Charleroi, or Namur. A week later the siege train arrived, and the trenches were opened, and in a few days the Governor, Kaunitz (the future Minister of Maria Theresa), asked for terms. He was willing to surrender the place if the troops might march out; but Saxe, though he was in a hurry to finish the business, would not let the garrison go. His reply was characteristic:—

"I know how much consideration is due to a numerous and brave garrison, and I should have been willing to grant it all the honours of war; but Brussels is not a place that can be defended; it would be impossible to bring together an army for its relief without risking total destruction; I have all the necessary material, and can increase it—whether guns or anything else—as much as I please; so only a little time and a few precautions are needed to enable me to impose conditions which would be fair but rather hard.

"It is not my intention to make Brussels a fortress; these great cities, which are the ornament of a country, ought all to be treated as Milan is. You have made the mistake of putting a large garrison in it, and it is fair that we should reap the benefit. However, I will send a courier at once to the Court for instructions; my only fear is of my own troops. They are conscious of their superiority, and even the soldiers are aware of the points of weakness of this great city, which I myself did not, and perhaps your Excellency does not, know. So I fear that if there should be a brisk attack they may force their officers to lead them on from all sides, and if I once have them inside I shall have to go and help them. You may judge, sir, what disorder and confusion this would cause. I should be grieved that my career should be marked by such an incident as the destruction of a capital."[1]

The siege went on. The Governor again sent out officers to parley, who were to say that help was expected. "You are quite right," Saxe replied, "brave men who expect help ought not to surrender. Go back within your ramparts and defend yourselves."[2] The Prince of Waldeck did in fact assemble what force he could at Malines, but he did not venture to attack the French; and on 20th February Brussels capitulated, the garrison of 12,000 men becoming prisoners of war.

A garrison of eleven battalions was placed in it; the rest of the French troops went into cantonments between Brussels, Malines and Louvain; and Saxe went off to Paris to receive the honours he had earned.

[1] Taillandier, p. 286.
[2] *Id.*, p. 292.

1746.

By the capture of Brussels the strength of the Allied Army was reduced to about 20,000 men. No troops could be spared from England till the Jacobite rising was put down; she could only contribute to the defence of the Netherlands by subsidies, and by sending Hanoverian troops there in British pay. The Dutch, alarmed at the French progress, were urgent for greater efforts to be made by the Allies, but adhered to their own position as auxiliaries, refused to declare war with France, and had their negotiators at the French Court. The defeats of Hohenfriedberg, Sohr, and Kesselsdorf had compelled Maria Theresa to follow the advice of the British Government, and come to terms with Frederic, so that Austrian troops were set free for the defence of the Netherlands. Yet when the campaign opened in the beginning of May, the Allied Army numbered only about 42,000 men, viz., 16,000 Austrians, 15,000 Dutch, and 11,000 Hanoverians and Hessians. It was commanded by Marshal Bathyany, and it was encamped behind the Dyle, from Louvain to Antwerp.

The French Army consisted of about 60,000 foot and 30,000 horse. The King arrived at Brussels in the beginning of May, and it was decided to push back the Allies upon the Dutch frontier, and then to complete the conquest of the western provinces by taking the fortresses of Hainault. The main force advanced in four columns upon the Dyle, between Wavre and Malines, while a force of 18,000 men moved by Nivelles, Gembloux, and Tirlemont, round the left flank of the enemy. Thus threatened, the Allies pivoting on their right drew back, first behind the Demer, and then behind the Nethes. Still pressed by the French, they left touch of Antwerp, and retreated northward, reaching Breda on 20th May. Saxe was not allowed to follow them over the Dutch frontier, for it was the policy of the Court not to irritate the Dutch, and he was also told not to set the example of violating the neutrality of Liége. He wrote to Frederic (19th May)[1]: "Your Majesty knows that the military course has always to bend to the political; so I trust your Majesty will not attribute to me the mistakes which may be made in the course of this campaign." Antwerp was entered by the French on 20th May, and its citadel surrendered on 1st June. The army encamped to the east of it, the King returning to Versailles, and a corps of 20,000 foot and 7,000 horse was detached to join a separate army, with which Conti was to besiege Mons.

Conti had commanded on the Rhine in 1745, and wished to have an army there again, but the danger of invasion on that side had disappeared, partly owing to Saxe's influence with the Court of Saxony. Saxe had carried his point, that the army of the Rhine should come to the Netherlands, but it had been conceded to Conti that it should form an independent command. The corps detached by Saxe brought it up to nearly 60,000 men. Mons surrendered on 11th July, and the siege of Charleroi was begun four days afterwards.

[1] Grimoard, iii, 200.

But meanwhile the Allied Army had not remained passive. Successive reinforcements, including four British battalions under Ligonier, had brought up its strength to nearly 70,000 men.[1] In the middle of July, Bathyany moved south-eastward to Peer, where he was joined on the 23rd by Prince Charles of Lorraine, who brought 12,000 Austrian troops with him, and assumed the chief command. The Allies were now considerably stronger than Saxe alone. It was decided to advance through the territory of Liége, along the watershed which separates the valley of the Meuse from the tributaries of the Scheldt, to turn Saxe's right and interpose between him and Conti, or at all events cover Namur.

On the 29th the army reached Hannut, and if it had pushed on quickly it would have placed the French in a critical position. But the weather was excessively hot, transport was difficult, and in two days the Allies advanced only six miles. They had enjoyed a great advantage in the Austrian Light Horse, which screened their movements, and made Saxe unable to discover their intentions. On the 26th, learning that they were near Hasselt, he had encamped his main body at Louvain, and pushed out detachments to Diest and Tirlemont. He thought it likely that they would cross the Meuse at Huy, but there was also the possibility that they might move on Antwerp. On the 29th he was still uncertain whether they were at St. Trond, when in fact they were 12 miles nearer to Namur. He learnt this on the 30th, and by a long night march up the valley of the Dyle, he brought his army into position near Gembloux, securing the important forest defile of the Cinq-Étoiles. Anticipated here, the Allies turned south, passed the Mehaigne, and on 2nd August drew up opposite to him, across the road from Namur to Gembloux, with their left resting on Mazy.

Saxe had written urgently to Conti to send him what troops could be spared from Charleroi. There were detachments of Conti's army near Gembloux, amounting to about 16,000 men, principally cavalry, and with these he hoped to make the enemy believe that the two armies were combined. But he found that Conti had directed them to take orders from no one but himself. Saxe was very indignant: "Since this is not to your taste," he wrote, "I can do no better than return to Louvain, as the preservation of the King's army is more important than the taking of Charleroi, which would equally miscarry if I get the worst of it." He remained, however, and the Allies did not attack, as they thought his position too strong. Charleroi opportunely capitulated, and Conti joined him on 3rd August.

A fresh difference now arose between the two Generals. Their combined armies were half as strong again as that of the Allies;[2] they were eager to fight, and Conti, with the general opinion at his back, vehemently urged that they should march against the enemy. But Saxe was not inclined to run the risk of a pitched battle when he

[1] Ligonier to Harrington, 12th July (F. O. Papers).

[2] Pajol gives the total at the end of July as 155 battalions and 291 squadrons, or about 120,000 men; he says, quite mistakenly, that the Allies were as numerous.

could secure his object otherwise. As he wrote not long afterwards to Frederic: "The French are what they were in Cæsar's time, and as he has described them, brave to excess but unstable; stubborn in holding a post till they are all killed after the first effervescence is over . . . . but bad at manœuvring in open country. You have no experience of these faults with your troops, and you know exactly what you may expect of them. As it is impossible for me to make them what they should be, I get what I can out of them, and try to leave nothing of importance to chance."[1] He did not use quite this frankness with Conti, but he pointed out that the Allies were now occupying one of those strong positions in which Luxemburg had baffled William III during the siege of Namur in 1692. After a warm altercation Conti conceded that it was for Saxe, as commander of the larger army, to decide whether to attack or not, but he held that "a Prince of the blood who holds a General's patent should be under no one's orders, not even those of a Marshal of France," and he obtained leave to return to Versailles. The two armies were then merged into one (14th August).

Namur was the next place to be taken, and Saxe proceeded with his own plan for forcing the Allies away from it. He pushed his left wing eastward to turn their right. This was drawn back, and the Allies took up a new position fronting northwards, with their front and right flank covered by the Mehaigne, while the French encamped opposite them near Hannut. The Allies drew most of their supplies from Liége by the Meuse, and Saxe made use of his superiority of numbers to cut this line of communication. He sent about 10,000 men down the left bank of the Mehaigne, who crossed the Meuse and occupied Huy. At the same time a cavalry detachment went to Liége and took possession of the Chartreuse, a fort on the south side of the Meuse; and another crossing the Meuse at Dinant searched the Condroz district, to which the Allies looked for forage. These movements in their rear made the position of the Allies untenable; it was necessary for them either to fight or retreat. Councils of war were held on 21st and 22nd August, at which Daun[2] was strongly for fighting notwithstanding their inferiority. The French Army occupied a very extended position from Braives to Vassaiges, and he argued that by crossing the Mehaigne opposite Ramillies the Allies could fall upon its right flank before it could change front to meet their attack. He was supported, though with some hesitation, by Ligonier and Bathyany, but Waldeck was against risking the whole army in such an adventure; and Prince Charles, finding opinions divided, would not take the responsibility.[3]

He waited till his supplies were nearly exhausted, and on the night of 29th August his troops crossed the Meuse between Namur and Huy and retreated eastwards by circuitous roads. Ligonier wrote

[1] Grimoard, iii, 181.

[2] "This young gentleman, if I am not mistaken, will soon make a very great figure in the world as a General," Ligonier wrote to Harrington soon afterwards.

[3] The proceedings of these and subsequent councils of war are among the F. O. Papers.

next day: "We have been near six weeks what one calls in presence of the enemy, and some people not being of opinion that we should attack them, and our bread being almost at an end, a resolution was taken to pass the Maes and approach Maestricht—a bolder step, and might have been of worse consequences, if the enemy had done what he could, than attacking their army, even on disadvantageous terms of numbers and situation. In consequence of this resolution we passed the Maes yesterday without the least molestation from the enemy, though our pickets lay within a hundred yards of theirs. I never made a campaign with such anxiety of mind. I am grown near a thousand years old."[1] On 6th September the army reached Visé (between Liége and Maestricht), much weakened in men and material.

The siege of Namur was at once undertaken by Count Clermont, assisted by Löwendahl, while Saxe, with about 50,000 foot and 37,000 horse, encamped at Tongres and pushed out detachments towards the Meuse to watch the enemy's movements. Namur had a garrison of 11 battalions, but the town held out only for a week, and the citadel even less. The last of the barrier fortresses was in French hands by the end of September. The brief resistance made by them all was partly due to the skill of the French engineers and artillery, but more to the temper of their garrisons and commandants, who only asked for an excuse to capitulate.

In the middle of September, the Allied Army having been reorganized and reinforced so that it amounted to 88 battalions and 194 squadrons[2] (or about 57,000 foot and 29,000 horse), besides light troops, passed the Meuse below Maestricht with the intention of attacking Saxe if he were not too strongly posted. They found him in a strong position behind the Demer, with his left at Bilsen and his right at Tongres, covered by redoubts on the height in front of it, while the Jaar protected his right flank. They were unanimously of opinion that to attack him was absolutely impracticable. Ligonier proposed that they should turn northward and employ the short remainder of the season in recovering Antwerp, but the Dutch were in favour of marching towards Namur, and the Austrians preferred to keep near the Meuse with an eye to winter quarters. Eventually the Dutch encamped in the angle between the Jaar and the Meuse, and the rest of the Allied Army at Herderen, north of the Jaar. Here they remained idle till 7th October.

Namur citadel having surrendered, Clermont was expected to rejoin Saxe: "Whether to attack us when joined, or whether they will go into winter quarters and detach, God knows," [wrote Ligonier]. "In the meantime we remain here, and I think now in a bad position; the Dutch parted from us by the Jaar. I think, therefore, that we shall, to-morrow or next day, pass that river, put our left on Liége and our right towards the Jaar, *autre situation scabreuse*, and where we must try to get forage from the other side of the Meuse with

[1] To Harrington, from Ohey, 30th August (F. O. Papers).
[2] Ligonier to Harrington, 13th September (F. O. Papers).

bridges, penned up between two rivers, and the lower Meuse—from whence we are, when the water rises, to have all our magazines—much exposed. But this is thought necessary to secure Liége as part of the winter quarters, the pays de Limbourg, and a communication with Luxemburg."[1]

The Allied Army moved accordingly on the 7th, and Saxe, who thought as Ligonier did about their new position, and saw his opportunity, determined to attack them. He had felt it necessary to apologise for his cautious strategy, which had provoked much discontent both in the army and at the Court, and he was not sorry to have a chance of closing the campaign by what he hoped would prove a brilliant victory, though, as usual, he took care to make it mainly "an affair of posts."

He notified his intention in a way of his own. He had brought a company of comedians to the army, telling Favart, their manager: "Do not think that I look upon this as a mere matter of amusement; it enters into my political views and the plan of my military operations."[2] "From taste as well as principle," says Marmontel, "he liked to have mirth in his armies, saying that the French never behaved so well as when one led them gaily, and that what they feared most in war was boredom."[3] Clermont having rejoined him, he caused Madame Favart to announce at the close of a performance that as there was to be a battle next day the company would not play till the day after.

On October 10 the French Army, consisting of 120,000 men (of which one-third were cavalry), was all brought over to the south side of the Jaar, and encamped in a crescent about 6 miles to the north-west of Liége, across the Tongres and St. Trond roads. The Allied Army seeing these movements, prepared for the battle, and lay under arms that night. It was drawn up along a ridge running north-east from Ans, and the extent of the position was about 6 miles. The slopes to the front were gentle; those to the rear, especially at the southern end, were steep, ill-suited to lateral movements and fresh formations to a flank. The right was protected by a ravine in its front, and the Jaar on its flank; it was strong for defence, but for the same reason ill-suited for counter-attack. Yet etiquette required that the Imperialists should be placed here, though they formed more than half the army (being 30,000 foot and 16,000 horse). They had the villages of Fixhe, Slins, and Anixhe in front of them, which they occupied with 12 battalions. The Hanoverians, Hessians, and British (17,000 foot and 6,500 horse) were in the centre, and held the three villages of Liers, Voroux, and Rocour as advanced posts with eight battalions. The Dutch (10,000 foot and 7,000 horse) were on the left, and a few battalions and squadrons were sent from the right wing to strengthen them, besides two battalions of Bavarians. Their front was open except for a redoubt and some batteries which they had made. The

[1] To Harrington, from Herderen, 5th September (F. O. Papers).
[2] Broglie, i, 334.
[3] Taillandier, p. 355.

village of Ans lay in a ravine on their left flank, and was occupied at first by the two Bavarian battalions and some light troops. The suburbs of Liége extended up the slopes behind them.

The plan of Saxe was to turn the left flank which rested on very intricate ground, to drive in the left behind the centre, and then force centre and left back upon the Meuse, while he made a mere demonstration against the right. His right wing consisted (reserves included) of 56 battalions, his centre of 76, and his left of 21 only. At 8 A.M. on the 11th October the right wing began its march, but there had been a storm in the night and the ground was heavy. When Clermont, who commanded this wing (assisted by Löwendahl), arrived in front of Ans and found it strongly held, he halted, sent off a report to Saxe, and asked for reinforcements. It was 3 P.M. before the attack was delivered, but by this time the light troops had worked round nearer to the Meuse and into the suburbs of Liége, so that the Dutch then found themselves assailed in rear as well as in flank. Waldeck had thrown his reserve of five battalions into Ans to reinforce the garrison; but his artillery was overpowered, his infantry outnumbered, and he had to fall back to a new position along the Tongres road nearly at right angles to the main line of battle.

This position was tenable only so long as the village of Rocour, which covered its right flank, was held. This village was occupied by two British[1] and two Hessian battalions, while Voroux and Liers were each occupied by two Hanoverian battalions. They had been carefully prepared for obstinate defence during the two preceding days, but Zastrow, who was in command, had asked in vain for additional troops to guard the intervals between them. He had been told that the whole line would support him. About 1 o'clock the French began to cannonade him with 16-prs. and 24-prs., to which he could only oppose his 3-pr. battalion guns.[2] About 3.30 P.M. the French infantry advanced. Three brigades belonging to the left wing were directed upon Liers, but owing to a misunderstanding their attack was not pushed home. Rocour and Voroux were attacked by eight brigades of the centre, formed in columns of battalions in echelon. "It must be said for M. de Saxe that his attacks were strong and without confusion, and as soon as two brigades had been repulsed at each village, a third ran in without firing a shot."[3] After about three quarters of an hour's fighting, Rocour, which was exposed on two sides, was carried, and Voroux soon afterwards. The 4,000 infantry that garrisoned them had been left quite without support to deal with five times their number. Prince Charles wrote: "We were beginning to support it [Voroux], when the Dutch began to give way and their cavalry to retire in disorder, so that they lost first of all the high ground and a part of their guns on the high ground where they had their redoubt; this post once abandoned, the French

[1] Viz., Howard's (19th) and Graham's (11th).

[2] Zastrow's report, and also that of Waldeck, is printed in the "Neues Militärisches Journal," Band 2, Hannover, 1789.

[3] Ligonier to Harrington, from Amby, 12th October (F. O. Papers).

took the village of the Hanoverians in front and flank, and carried it after a very brisk attack."[1]

The loss of Rocour had obliged the Dutch to fall back lest they should be cut off from the rest of the army. They retired, writes Ligonier, "in pretty good order considering what they had suffered, and, taking behind our left, marched towards the Meuse to St. Peter's Berg [near Maestricht]. The enemy's foot with great shouts began to come out upon the plain in great numbers, but upon our marching upon 'em with the cavalry at a great trot sword in hand, they run back into the hedges much faster than they came on; and being now resolved to retire, the three battalions which I had sent for in the night from Maestricht, and who arrived with Brigadier Houghton as the affair was beginning,[2] were placed in a right angle with the Grey Dragoons facing the flank which the Hollanders had before. When this came even with the Prince of Hesse, he had orders to join that. General Somerfelt [commanding the Hanoverians] had formed another flank a little farther to receive us, and the Prince and Marshal another under Prince Dourlach, and when we came here we found by the Prince's and Marshal's disposition a rear guard of 20 squadrons, 12 battalions and 12 companies of grenadiers; so that in spite of perhaps 100 pieces of cannon, all the musket shot they could bring to bear, I never saw a retreat made with that quiet and order. The rear guard was made by the Imperialists, the Marshal insisting upon it, as they had not suffered in the action. . . . . My Lord, the enemy had not less than 170 battalions. If we fight with these disproportions of numbers I fear we must sometimes have the worst of it; but assure yourself that this is not half the consequence that the enemy will publish, and if they please to detach now I don't know but we may again speak with them. On ne saurait être plus mortifié que je le suis de vous apprendre cette mauvaise nouvelle, mais ce n'est pas ma faute. Je me suis opposé autant que je l'ai cru décent à la position que nous avons prise. La grande envie qu'on avait de combattre non a pas laissé examiné tous les inconvénients."[3]

Saxe's own account of the battle is of rather different tenor: "Yesterday I beat Prince Charles hollow; and if I had had two hours more daylight he would have saved nothing, for I had him cornered between the Jaar and the Meuse. But God would not have it. Night surprised us when we had pursued him for two leagues. The attack of Löwendahl, whom I had detached on my right and was waiting for from 10 o'clock in the morning (for I was in presence of the enemy by that time), did not begin till 3 in the afternoon. So one can only reckon the battle as beginning at 3; at 5 they were in full rout; and at 6 we had to stop."[4]

[1] Arneth, iii, 457.

[2] These battalions (the 33rd, 13th, and 25th) had come from Scotland, and been detained for some time in Holland for want of transport.

[3] To Harrington, *ut supra*. Ligonier was in command of the British and Hessians, but not of the Hanoverians.

[4] To Count Brühl (Vitzthum, p. 46). French writers give a very erroneous account of the retreat of the Allied Army. Pajol, for instance, says that it was cut in two, and had lost its communications: "Their centre and left were retiring

It was an infantry battle with hardly any fighting in the open, and Saxe owed his success as much to his opponent's passivity and want of skill as to his own excellent dispositions. It fell far short of his hopes, but it did something to foster mutual confidence between his troops and himself. "Je me raccommode avec l'infanterie," he said, with Fontenoy in his mind. Otherwise the French reaped little advantage from it, for both armies took up their winter quarters without further operations. The loss of the French is said to have been 3,500, or about two-thirds of that of the Allies; and they took a large number of guns and flags. In writing to such a master of the art as Frederic, Saxe thought it best to forestall criticism by saying that one does not fight battles for the mere fun of it, but that the opportunity offered him was too good to be missed.

Saxe returned to the Court in ill-humour. Conti had obtained from the King the patent of Generalissimo, which would place him in future over all other French Generals if he were employed again in the field, which, as a matter of fact, he was not. Saxe felt this to be a slur on himself. "I know the respect that is due to the Princes of the house of France [he said], and I shall never be wanting in it; let the King declare them all to be Generalissimos from the cradle, and I have nothing to say; but that the Prince of Conti should have obtained this title as a recompense for his services, I think I have a right to complain."[1] Conti's promotion was mainly due to Madame de Pompadour, who was under personal obligations to the Dowager Princess; but Count d'Argenson, the Minister of War, had had a share in it, if only a formal one, and incurred Saxe's resentment. He had a grievance, too, against the other brother, the Minister of Foreign Affairs, whose policy it was to spare the Dutch, in the hope of detaching them from the alliance, and who had hampered him in his operations.

He readily lent himself, therefore, to the growing faction against the two brothers, and co-operated with the Court of Saxony in drawing France towards Vienna and away from Berlin. The Marquis fell at the beginning of 1747; the Count kept his place as Minister of War, but made his peace with Saxe by helping to obtain for him the rank of Marshal-General which had been held before him by Turenne and Villars only. "This makes me the first General of the Kingdom [he wrote]. In the military line I can rise no higher, or I shall break my neck. Now I should like peace to come quickly, so that I may retire with honour."[2] His position at the Court was also strengthened. He had earned the gratitude of Madame de Pompadour by dissuading the King from coming back to the army, and she worked with him in bringing about the marriage of the

in disorder towards the three bridges that had been made at Visé, where with a little more daylight we should have killed or drowned all who had not passed" (iii, 489). Waldeck, like Ligonier, states that the whole army retired to the height occupied by the fort of St. Peter, near Maestricht, where it crossed the river.

[1] Broglie, ii, 59.

[2] To Count Brühl (Vitzthum, 154).

Dauphin with his niece, the daughter of the King of Poland. The "foreign bastard" was now the uncle of the Heir Apparent.

1747.

Before setting out for the Netherlands for the Campaign of 1747, Saxe obtained leave to carry on his operations as he pleased, and to press them as far as might suit him. He was still told, however, that "in attacking the Dutch the intention is to be very considerate towards the country and the people, the main object being to let the Government feel the ill-effects of allowing itself to be swayed by foreign influence, and to oblige it at length to join heartily in efforts for peace for the safety of the Republic itself. It is an extreme remedy which we want to apply with moderation, so far as is compatible with firmness and vigour of execution."[1] Saxe took care that the latter were not wanting.

The Allied Army was to be commanded this year by the Duke of Cumberland, and, according to the agreements made, it was to consist of 136,000 men; but the Dutch and Austrian contingents fell short of their promised strength, and the actual total was under 100,000. It was early in the field, encamped between Breda and Eyndhoven, but was unable to move for some time for want of supplies, and the health of the troops suffered to no purpose. The total strength of the French was about 140,000. In the beginning of April the main army of 100,000, under Saxe, was concentrated between Brussels, Malines, and Louvain; while a corps of 15,000 men, under Clermont, was at Namur, and a siege corps was assembled under Löwendahl at Ghent, to get possession of Sluys, Hulst, and other small fortresses upon the left bank of the Scheldt, and so pave the way for the invasion of Zeeland. "While waiting for the campaign to open, we have amused ourselves with taking Dutch Flanders," Saxe wrote to his brother.[2] The fortresses surrendered with a celerity that did more discredit to their commandants than honour to their captors. Cumberland could do little to help them without uncovering the more important frontier from Berg-op-Zoom to Bois-le-Duc. By the middle of May all the country on the left bank of the Scheldt was in French hands.

This rapid progress, and the preparations made by Saxe for invading Zeeland, caused great excitement among the Dutch, but they did not immediately tell in the direction the French Government desired. The peace party was for the time silenced; the negotiations which had been going on at Breda were broken off; and, to give more vigour and unity to the national defence, the Stadtholderate, which some of the provinces had dropped, was revived, and made hereditary in the House of Orange. But the William of Orange who was now called by popular acclamation to the chief direction of the Republic had not the character and talents of his two great predecessors, and hindered rather than helped the cause of the Allies. There was

[1] Noailles to Saxe (Broglie, ii, 178).
[2] To Augustus III, 4th May (Vitzthum).

friction between him and his brother-in-law, Cumberland: "Our two young heroes agree but little. Our own is open, frank, resolute, perhaps hasty; the other assuming, pedantic, ratiocinating, and tenacious," wrote Pelham.[1]

Cumberland was, meanwhile, preparing a counterstroke. He meant to lay siege to Antwerp, and in the early part of May he advanced to within a few miles of it. Saxe was well aware of his intention, and hoped to see it carried out. He increased the garrison to 28 battalions, and sent Löwendahl to command it. He moved his own head-quarters forward to Malines, but his army remained behind the Dyle, between Malines and Louvain. On 12th May Cumberland wrote: "I fear the French have taken such precautions, and the Dutch have been so dilatory, that the siege of Antwerp is hardly to be undertaken; but we must still keep up the appearance of that being our intention, though our present design will be to try if we can come to an action immediately."[2] His information led him to believe that Saxe had only 60,000 men actually with him. But he stood alone in wishing to attack the French Army in its strong position behind the Dyle. Waldeck was for remaining on the defensive, covering Holland; Bathyany, who had advocated such an attack while Cumberland was bent on besieging Antwerp, was now against it; even Ligonier thought the risk too great. On 26th May the Allied Army moved away from Antwerp and encamped between Lier and Herenthals, about 12 miles north of the Dyle. Here it lay for some time waiting for the French to make a movement which would give it the desired opportunity, and suffering much from sickness and difficulties of supply, as the Scheldt was no longer available.

Saxe, whose troops were under much better conditions, would gladly have prolonged this situation, which was increasing the odds in his favour. But Louis XV joined the army at the beginning of June; he was bored at its inactivity, and there were many (the Minister of War among them) to suggest that Saxe was prolonging the war in his own interest; and soon "the siege of Maestricht was resolved on, contrary to the opinion of Marshal Saxe."[3] To march at once upon Maestricht, however, would be to expose Brussels, and, in fact, the whole of the Netherlands, to the Allies. If the siege was to be carried out, it was essential first of all to draw the Allied Army towards the lower Meuse, and to paralyze it. Accordingly Clermont was called up from Namur, and his corps was pushed eastward to Tongres, linked by several intermediate detachments with the main army at Louvain.

The movement answered its purpose. On 23rd June Cumberland wrote from his camp on the Nethe, that French troops were gathering between Tongres and Bilsen, which "begins to look a little more

[1] To Walpole, 14th August, 1747 (Stanhope, "History of England," iii, p. 496).
[2] To Chesterfield, now Foreign Secretary (F. O. Papers).
[3] "Réflexions sur les Campagnes de Flandre en 1747," 2 vols. Paris, 1758. This is an anonymous work adverse to Saxe. The writer is acute and well-informed. Permission to print it was given on the application of Sieur Dumoulin, and as that was a pseudonym of Voltaire, he may have been connected with it.

seriously towards Maestricht," and that the Allied Army would march in that direction. Three days afterwards he wrote from Meldart (near Diest), that the army would reach Hasselt next day, and that if Clermont remained at Tongres and was not supported, he would run great risk of being forced to retire across the Meuse. "Should the whole French Army come up to sustain him, I flatter myself we are in a condition to give a good account of them."[1]

Saxe waited to make quite sure that the whole army of the Allies was marching to the Meuse, telling Clermont, who had moved northwards to Mopertingen, that if he was cut off he should cross the Jaar, and make his way back to St. Trond by Warem. On the 29th there was no longer any doubt; the army left the camp at Louvain that night, and advanced by forced marches on Tongres, while Saxe himself hurried on ahead, arriving there on the morning of the 30th.

Instead of crossing the Demer at Hasselt and moving direct on Tongres, the Allied Army had continued its march up the right bank of the river, and on the 30th encamped at Gellick, within 4 miles of Maestricht. Cumberland's despatch of 3rd July (the day after the battle of Laeffelt[2]) describes what followed :—

"I am very sorry to be forced to acquaint you that yesterday we had a very brisk, but not successful, affair between our left wing and almost the whole of the enemy's army. As I had acquainted you in my last, we had proposed marching to Tongres to cut off Count Clermont's army, but finding M. de Saxe was making preparations to sustain him, we thought the best and least hazardous undertaking would be to try to take possession of the camp between Tongres and Bilsen, without the view of cutting him off; for which purpose the several corps under Count Daun were ordered on the 30th past to take possession of Bilsen and the heights of the Grande Commanderie, and the same day the grand army was ordered to march to Gellick, and to march the next morning at daybreak, in order to join those detachments as early as they could.

"Upon my hearing that the enemy was still posted at Tongres, I went myself to the Grande Commanderie, and I found by M. de Clermont's position that he must be sure of being sustained by the main army, otherwise he would never have ventured to continue so near us. The next morning I was out myself by break of day, and perceived the enemy marching down in two large columns from Tongres, as I thought with a design to get possession of the heights of Herderen and Millen, or to fall down upon the heads of our columns which were marching from Gellick that way. Upon which I ordered the Prince of Wolfenbüttel to take possession of the villages of Gros- and Klein-Spauwen with the infantry of the corps de réserve, and to place his cavalry on his right, on a small plain there was between that and the Grande Commanderie, and I went to the left to see if there was time to form our cavalry for the reception of the enemy. But before the head of our cavalry could come up, the

[1] To Chesterfield, 26th June (F. O. Papers).
[2] Otherwise La Veldt or Val.

enemy had already formed three lines of cavalry upon the heights of Herderen.

"As we were no longer masters of those heights, we formed our right at the Commanderie, occupying all the heights and villages in our front as far as Kesselt, in a line with Maestricht, and the Austrians formed a very considerable flank back upon Bilsen, from the Commanderie. That whole day we passed under arms over against each other, and lay all night upon our arms. Next morning, which was yesterday, at break of day the enemy made several countermarches over against us, and at 9 in the morning we judged they had no further design of attacking us that day; and we were just assembled together at the Commanderie to refresh ourselves, and to give orders to all the different detachments, when Sir John Ligonier sent Lieut.-Colonel Forbes to acquaint me that he imagined the enemy was just going to attack us, or to endeavour to outflank us and cut us off from Maestricht, on which I immediately went to the left, and desired the Marshal to put the right instantly under arms.

"About an hour after I came there, and had made my dispositions, and placed all our batteries, the enemy appeared formed in a deep column 12 battalions abreast, in order to attack a small enclosure with about four or five small houses in it, where we had four battalions posted; and about that village [Laeffelt] alone almost the whole of the action was, which lasted above four hours.

"After it had been taken and retaken four times, and when we had made ourselves masters of it by the succour of our own detached troops which came to us from the right,[1] by the misconduct of some Dutch squadrons on our right the line of foot without the village began to give way a little. They were, however, again put in order. I then went to form that part of the cavalry which had been in disorder, but I found myself cut off by some squadrons of French cavalry which had broke in, and was forced to retire to our cavalry, who by that time had charged and broke the enemy's first line, and afterwards, while I was with them, charged a second time and broke the enemy again, but, pursuing them too far, received a fire from some foot who lay behind the hedges, which gave the French cavalry time to form again, and then they forced ours to retire. In the meantime our infantry retreated towards Maestricht to where we joined, and there was some danger of our being cut off from the army. I marched to Lonaken with all the cavalry, to favour the retreat of the Dutch and the right wing, which was effected so successfully that they lost nothing but some few men by cannon-shot. . . . . I flatter myself His Majesty will have the goodness not to condemn us for our misfortune, but to be assured I was always in the design of obeying his orders not to run risks; but this was so unavoidable that I hope His Majesty will excuse it. . . . . I hope you will excuse the inaccuracy of this long tedious letter, but really both my mind and body have been so harassed for these four days that I have hardly eat or been

[1] Nine battalions, which had formed part of Daun's mixed corps.

in bed. But by the next post I will endeavour to send an exact detail of the whole."[1]

The battle and the movements preceding it have now to be looked at from the other side. The ground between Tongres and Maestricht forms a plateau, falling gently to the north, intersected by a stream which runs from Riempst into the Jaar. The villages of Gros- and Klein-Spauwen are on a northerly spur of this plateau, while a lower spur goes north-eastward towards Maestricht, on which Laeffelt and Kesselt are situated. Between the two spurs a small stream finds its way from Vlytingen by Heer into the Meuse below Maestricht. The village of Herderen, on the Tongres-Maestricht road, is about the middle of the plateau and gives it its name. To deny these heights of Herderen to the enemy Saxe pushed forward all the troops available, and made as imposing a show of cavalry as he could. He sent orders to the troops on the road to hasten their march, and as the whole operation had been forced upon him he was careful to have the King's decision whether he should attack or not. "What is his own opinion?" asked the King, who was then about 6 miles west of Tongres. "Sire, he will carry out exactly the orders your Majesty may give." "Yes, they should be attacked, and without hesitation," answered the King, and hurried on to the field,[2] where he arrived on the afternoon of 1st July. In the course of the night the whole of the troops came up, some of them having marched nearly 40 miles in 48 hours; and as they came up the French line of battle was formed, running east and west through Herderen, and reaching nearly to the Jaar. The army seems to have consisted of about 125,000 men, one-third being cavalry.

The Allied Army, which was drawn up parallel to it, numbered about 90,000, of which 25,000 were cavalry, besides irregulars. The British contingent comprised 5 regiments of cavalry and 14 battalions of infantry, or about 12,000 men. Together with the Hanoverians and Hessians they formed the left wing, the Dutch being in the centre and the Imperialists on the right. As at Rocour, the position of the latter was "an exceedingly good one to receive an enemy in, but not at all proper to attack from; and if there was anything with regard to the right wing which might be wished to have been otherwise, it would be that so great a proportion of the whole force had not been employed to strengthen what was itself so very strong, but that part of it had been made use of on the left, or at least been kept as a reserve to follow occasions."[3]

Accordingly Saxe determined to act as at Rocour, to contain the Austrians by a sufficient force at Herderen, but to make his attack upon the left and left centre. Sallieres, with 6 brigades of infantry

[1] To Chesterfield, from Heer (F. O. Papers). The more detailed report promised was furnished three days afterwards, and from it the account published by authority (*vide* "Gentleman's Magazine" for 1747, p. 315) was no doubt taken. It is not in the F. O. Papers. The spelling of the names of places has been altered to agree with Belgian maps.

[2] "Souvenirs de Valfons," p. 208.

[3] This is given as Cumberland's view by his secretary, Sir E. Fawkener, in writing to the British Minister at Vienna. (Coxe: "Pelham Administration," i, 493.)

and 20 guns, was to attack Vlytingen, Clermont, with 4 brigades and 20 guns, was to seize Laeffelt, and d'Estrées, with some grenadiers and light infantry, was to get possession of Wilre, which was on the extreme left of the Allies and was held by Austrian light troops.

But the disposition of the Allies upon which these orders were based was altered on the morning of 2nd July. The troops were withdrawn from Vlytingen, which lies in a hollow commanded from Herderen, and the village was burnt; while Laeffelt, which had been at first treated as an advanced post, was made part of the main line. Four battalions were posted in it and several others behind it, and more than 30 guns were placed along its border or on its flanks. Consequently Sallieres found that he had no enemy to attack, while Clermont found his force insufficient for the work it had to do. "The hamlet of Laeffelt," says a French writer, "is very large, and like all the other villages of that plain is surrounded with several orchards one behind another, and each enclosed with mud walls 6 feet high, upon which are planted quick hedges which are extremely thick, so that each village is, as it were, a citadel. . . . . As we had not, prior to the attack, fired upon that village, we were not able to destroy the mud walls topped with quick hedges with which it is enclosed, and which occasioned a great obstruction to our troops and caused a great loss of men."[1] The first assault was made about 10.30 A.M. by only eight battalions, who penetrated the outer enclosure but were repulsed. A second, third, and fourth assault were made, each time with increased numbers—15, 27, 37 battalions—but with only temporary success. The garrison received successive reinforcements, and though at times driven out it always recovered possession of the rear part of the hamlet.

At noon Cumberland proposed a general advance, and the Imperialists drove a few French troops out of Elligt (between Gros-Spauwen and Vlytingen), but the advance went no farther. Meanwhile Saxe brought up all Sallieres' troops except one brigade, and himself directed a fifth attack upon Laeffelt with 49 battalions, or nearly 25,000 men. Some of these troops he sent round the right flank of the hamlet, to enter it from the rear.

An English artillery officer writes: "They really behaved very well. Though we cut them down with grape shot from our batteries, they did not seem to mind it, but filled up their intervals that we made as they advanced."[2]

Saxe had also brought two brigades of cavalry from his right wing, and observing a gap in the line between Vlytingen and Laeffelt, the troops having been drawn off to the latter, he sent some squadrons through it. These charged some Dutch cavalry which had been placed there, and drove them back in confusion upon a column of

[1] "Réflexions sur les Campagnes de Flandre en 1747," referred to above. The quotation is from a translation published in London in 1760, with the title, "Remarks on the Military Operations during the Campaign of 1747."

[2] Extracts from a diary, given in the Records of the 32nd Regiment, p. 41.

five battalions of infantry,[1] who were on their way from Gros-Spauwen to Laeffelt, and who were so much disordered that they left the field altogether. The French squadrons were in their turn driven back, but the confusion created, and the want of these battalions, caused the loss of Laeffelt, and the retreat of the infantry of the left wing by Kesselt on Maestricht.

This was about half-past 1. The light troops who had hitherto held Wilre withdrew from it, and the French cavalry of the right wing began to push past it, to cut off the retreat. The two brigades borrowed by Saxe had been brought back, and the gendarmerie and carabineers had come up from the reserve, so that there were 70 squadrons. The cavalry of the allied left wing under Ligonier, amounting to 48 squadrons, was drawn up in two lines, between Laeffelt and Wilre. It had already made one successful charge, and in order to cover the retreat Ligonier now charged again. He lost many men, and was himself taken prisoner, but he effected his purpose in a way that drew the admiration of the enemy.

Leaving Clermont to follow up the left wing of the Allies, Saxe ordered Clermont-Tonnerre, with 30 squadrons of cavalry and a brigade of infantry, to press upon the flank of their centre and right, while he himself should attack them in front. He then went to the King at Herderen, to arrange for the advance of the troops posted there; but "staying too long to hear the compliments and congratulations upon his victory, lost three hours of very precious time," according to his critic, "and by that dilatoriness the enemy retired without being disturbed, because we had no mind to interrupt them; and the gaining of the battle of Laeffelt did not advance us one step."[2]

How far Saxe was really to blame, whether he was hampered in his action by the presence of the King, and whether the French troops were in a condition to push their advantage at once against some 60,000 men, who had hardly been engaged as yet, it is impossible now to determine. At any rate the Dutch and Imperialists withdrew almost unmolested; and whispers again went round that Saxe was in no hurry to finish the war by too decisive a success. Valfons, who was on his staff, has even declared that Saxe said as much to him on the field itself; but a statement in itself so improbable needs much better evidence than that of Valfons, who was on intimate terms with d'Argenson, and was the last man to be selected for such a confidence.

It may safely be assumed that Saxe would have been better pleased at a more complete victory, but his arrangements show more anxiety to guard against disaster than to improve success, and, in particular, he made little use of his artillery, keeping most of it in reserve at Herderen and Berg. He himself owned to Ligonier "that the battle was not worth winning at the rate they had bought it, since they could not cut us off from Maestricht, and that they had lost above 1,000 officers and 9,000 men."[3] Their actual loss is given by Count Pajol as

[1] These were two British, two Hanoverian, and one Hessian battalion, which had formed part of the reserve corps.

[2] "Réflexions sur les Campagnes de Flandre en 1747."

[3] Cumberland to Chesterfield, 10th July (F. O. Papers).

8,700. That of the Allies was under 6,000, nine-tenths of which fell upon the left wing. This naturally provoked comment. Louis XV remarked to Ligonier that England was doing all the paying, and all the fighting too, for the Allies. Chesterfield wrote: "There is one circumstance which seems to want clearing up very much, and that is, how the position of the Austrians was such as not to be able either to second or sustain your Royal Highness on the left when an action was expected. The same thing happened before at the affair of Rocour, and it seems extraordinary that in two actions successively the right wing should have had no share in either."[1] Cumberland, who was himself responsible for the order of battle, excused the Austrians, but threw the blame of the result on their light troops, whose "supine negligence" allowed the enemy to seize the heights of Herderen.

The right and centre of the Allies retreated north-eastward to Reckheim. There they crossed the Meuse in the night, and reunited with the left which had crossed at, or a little below, Maestricht, and the whole army encamped to the south-east of that place. Saxe assuming that it was retreating northward had ordered St. Germain to cross at Reckheim, and d'Estrées near Visé, to complete the investment of Maestricht. On learning next morning what had actually taken place, he cancelled these orders; he complained much that his outposts should have sent him no word of a movement which might so easily have been hindered; but he at once decided that the siege of Maestricht was impossible, and obtained the King's permission for the siege of Berg-op-Zoom instead.

Some writers—Count Pajol and Major Crousse,[2] for instance—have regarded the whole of these operations as an adroit manœuvre on the part of Saxe to draw the Allies away from Berg-op-Zoom, and enable him to carry out a siege which formed part of his plan of campaign. Chesterfield wrote to Cumberland immediately after the battle of Laeffelt that he had reason to believe that this was the French object; to which Cumberland replied: "All the intelligence I have been able to procure and what M. de Saxe himself told General Ligonier entirely disagree with your intelligence of the enemy only having made a feint as to Maestricht."[3] The author of the "Réflexions," already quoted, assumes that Saxe was really aiming at Maestricht, but made so many mistakes both before and during the battle that he had to give up that design and adopt a fresh one. The truth seems to lie between these two views. Saxe had all along, even in the year before, been in favour of bringing the war home to the Dutch, and making them feel sharply the price they must pay for their share in it. The conquest of Dutch Flanders was only a first step, which some people regarded as mere waste of time and men, and which was so in fact unless it were followed up. The immediate effect of his success upon the Dutch temper strengthened

[1] To Cumberland, 10th July (F. O. Papers).

[2] "La Guerre de la Succession d'Autriche dans les provinces Belgiques." Brussels, 1885.

[3] 17th July (F. O. Papers).

the position of those who, like d'Argenson, had been against strong measures with them, and went to convict him of a blunder. This would be confirmed by undertaking the siege of Maestricht which would have no coherence with his earlier operations; and Saxe, while fully alive to the importance of that place, was averse to the siege. It was forced upon him, and he apparently meant to make the best of the circumstances. But he did not mean to hazard a second Fontenoy by investing the fortress while a confident army of 90,000 men was left free to take its own measures to relieve it. He preferred to fight the Allies with his full strength, and deliberately drew them to Maestricht instead of trying to be beforehand with them. He had kept a second string to his bow by leaving 13,000 men with Löwendahl at Louvain, a needlessly large force to guard the Dyle, as his critics have complained; and when the indecisiveness of Laeffelt put Maestricht out of the question, he was not sorry perhaps to revert to his original line of operations.

Orders were at once sent to Löwendahl, who had made all preparations for this contingency, and appeared before Berg-op-Zoom on 11th July. Three days afterwards the trenches were opened. Löwendahl was sanguine, but the undertaking was a formidable one. The place, which was one of the most important links in the chain of fortresses along the Dutch frontier, had proved too much for Parma and Spinola, and had since been remodelled by Coehorn. To the north of it there was an entrenched camp extending about 10 miles to the mouth of the Meuse, so that it could not be invested, and continually received fresh supplies of men and stores. An officer who visited it a few days after the siege began reported: "There are in the city 7 battalions and 2 squadrons, but weak in numbers and not in very good heart. However, they may be daily relieved or reinforced from the lines."[1] In these there were 13 battalions and 19 squadrons. The Prince of Hesse-Philipstal was the Governor, but General Cronstrom, who was given the chief command of all the Dutch forces, though he was 80 years of age, took up his quarters in the town and directed the defence.

The Prince of Orange, much more concerned about Berg-op-Zoom than about Maestricht, wrote urgently to Cumberland begging him to bring the Allied Army back at once to oppose Löwendahl; but Cumberland replied that if they abandoned Maestricht it could not hold out more than a month, and their whole communication with Germany would be cut off. He let the Dutch troops return, however, to Breda, and sent others also, so that by the end of August he had only 72 battalions and 113 squadrons (amounting to about 56,000 men), including the garrison of Maestricht. But the troops sent served to little purpose. Waldeck, refusing to serve under Cronstrom, was deprived of his command: "though I have not more reason to be pleased with Prince Waldeck this year than I had formerly [wrote Cumberland], yet I cannot help being sorry for his removal just upon this occasion, as I fear M. Cronstrom has neither will nor strength left to carry any command, or to repair the wretched state

[1] General Stuart to Cumberland, 22nd July (F. O. Papers).

the Dutch troops are in."[1] A week later he said: "I am convinced every day of the melancholy consideration that we must actually reckon upon the Dutch troops as nothing."

In proportion as Cumberland reduced his own army and sent troops to Breda, Saxe reinforced Löwendahl, who pushed the siege with great vigour and skill. On 10th August, Cumberland wrote: "We may flatter ourselves that this morsel may prove too tough for the French"; but four days later he said: "affairs in that country wear a very bad face from their disunion, and the little concert there is in their council, of which we have had a very fresh instance in the ill-concerted and worse executed attack upon the village of Wouw [on the right flank of the besiegers], which was undertaken by order from the Hague though every General had given his opinion against it."[2] Cronstrom was at the same time writing to Cumberland, that mere reinforcements were of no use; sorties were far more likely to fail than to succeed, and would hasten the fall of the place; and it could only be delivered by an army outside.

The siege had become a war of mines, always a slow business; but the French were gradually burrowing their way in. On 11th September, Cumberland reported that officers who had just come from Berg-op-Zoom thought it would hold out all that month, but three days afterwards he said: "I fear by the despondency and desire to have the affair over that the commanders there show, everything is not done or employed that ought." It was no doubt owing to this desire to have the affair over that the Dutch allowed themselves to be surprised, and the place was carried by a night assault against which Cronstrom had taken no precautions, on 16th September.

The French loss in this two-months' siege was very heavy, owing more to sickness than to the enemy. Voltaire lightly says: "These contagious diseases laid up more than 20,000 men, but they were easily replaced." While it went on and success was still doubtful, Saxe was a target for jibes, and his enemies made the most of their opportunity. After Laeffelt, the King had written to the Dauphin: "I have just gained a great victory, and never was our great Marshal greater than to-day." On 24th August, the Marquis d'Argenson, the discarded Minister of Foreign Affairs, noted in his diary: "I have seen the letter of a courtier who sends word to Paris that Count d'Argenson's affairs are prospering, for the King is beginning to find out how little there is in Marshal Saxe. They blame him, and they don't choose to see that they themselves have botched his work, by making him go into enterprises which he did not like, but which nevertheless have to be carried through when once they are begun."[3]

Throughout the siege, the French Army remained encamped at Tongres, though gradually reduced to less than half its strength by detachments to Löwendahl. Noailles, the friend of Saxe, but something of a Nestor, thought it necessary to urge upon him in the strongest way that the siege must not be allowed to miscarry, but

[1] To Chesterfield, 24th July (F. O. Papers).
[2] *Id.*, 10th and 14th August (F. O. Papers).
[3] Taillandier, p. 30.

the place must be taken at all costs, both for the point of honour and for its own sake: "it is the key of Zeeland; it would enable us to get possession of the places which would open the waterways and would oblige the Dutch to keep a considerable force in Zeeland and even in Holland."[1] Others insisted that the whole army ought to march there, instead of remaining to watch the Allies, and Löwendahl himself had suggested this. Their clamour drew from Saxe a remarkable memorandum on the whole course of the campaign. As regards Berg-op-Zoom, he declared that Löwendahl had men enough to take it if it could be taken, and if the siege failed it would be an affront to the King if he were there; the army would starve, and immense resources would be thrown open to the enemy, who might even enter France itself. "In war [he continued] one must often act on inspiration; if one were always bound to explain why one takes this course rather than that, one would be frequently contradicted; circumstances can be felt better than they can be explained, and if war rests on inspiration men should not worry the diviner."[2]

The capture of Berg-op-Zoom turned the tide in his favour. Löwendahl was made a Marshal. "What will my nobility say?" asked Louis, when Saxe claimed this reward for his lieutenant. "They will say that your Majesty knows how to reward great achievements, and that nothing is impossible to your Majesty's troops when they are well led," Saxe replied. In the beginning of October, Fort Lillo, on the right bank of the Scheldt, below Antwerp, was taken by the French, so that the river was open to them for navigation. After that both armies took up their winter quarters. Saxe was made Governor-General of the Netherlands, and had his residence at Brussels.

The French successes did not make Louis XV any the less desirous of peace, or induce him to raise his terms. Ligonier, though the son of a Huguenot refugee, was very well treated when he was taken prisoner. Cumberland wrote: "He has had very extraordinary honours done him, and been received as well by the French King as the Marshal of Saxe, with a very surprising familiarity."[3] They wished to make use of him for peace negotiations, and soon released him on parole. He brought back with him a proposal that the King should treat with the Duke through the medium of Saxe and any British officer the Duke might name: "It would be very glorious for His Most Christian Majesty as well as for His Royal Highness that peace should be made at the head of the two armies." Cumberland was much taken with the idea, but the British Government may well have doubted whether he was better able to cope with Saxe as a diplomatist than he was as a General, and they certainly mistrusted the methods which Saxe wished to adopt. In the postscript of a letter to Ligonier (30th July) he wrote: "If you have something to say to me which tends to good and to our object, and which it is useless for

[1] Grimoard, iv, 230.
[2] Grimoard, iv, 160.
[3] To Chesterfield, 7th July (F. O. Papers).

them [the Court] to know, write to me on a separate sheet and in a separate envelope. This way of negotiating will strike you as odd, but you will easily see the advantage of it. It is a case of pushing our masters forward on both sides, and for that it is necessary for us to say things which they would not consent to."[1] Eventually Lord Sandwich was sent out, and had some conferences with the French Foreign Minister at Liége, with the result that formal negotiations between the belligerents were resumed at Aix-la-Chapelle in the beginning of 1748, and on 30th April, preliminaries of peace were signed between England, Holland, and France.

1748.

In spite of these negotiations, preparations for another campaign were made on both sides. "Peace lies in Maestricht," said Saxe, and he determined that the capture of that place should be his first business. His plans had been most carefully worked out, and were executed with precision. He advanced as though he meant to besiege Breda, and then, leaving strong garrisons in Berg-op-Zoom and Antwerp, he directed his army in four columns on Maestricht, before which he arrived on April 8 with 70,000 men. Three days afterwards he was joined by Löwendahl, who had come through the country of Luxemburg and Liége with 35,000 men, and descended by the right bank of the Meuse. But the operation, admirably as it was conducted, has only the interest of peace manœuvres, for it was unopposed. The Allies had agreed to put 180,000 men in the field, including 30,000 Russians. But the latter had to march across Europe, and the Dutch broke down absolutely as regards both men and money. The Allied Army assembled at Ruremonde, under Cumberland, on 11th April, numbered only 35,000 men, and could do nothing to hinder the siege. It began on 15th April, and was vigorously pushed, but it did not run its full course. On the signing of the preliminaries a fortnight afterwards the Governor was directed to capitulate, and the French entered the place on 12th May.

It was mortifying to Saxe to see all that he had won for France in the Low Countries handed back by the diplomatists in exchange for what she had lost elsewhere. He wrote to Maurepas, then Minister of Marine, that France could better bear a continuance of the war than England or Holland: "It is worth while to put up with some inconvenience to acquire a province like this, which gives you magnificent ports, millions of men, a barrier impenetrable, and easy to guard. That is how it strikes me; however, I know nothing about your confounded politics. I see and know that the King of Prussia has taken Silesia, and has kept it; and I wish we could do likewise. When all is said and done, he is not so strong as we are; he is in a much worse position, he can be taken by the heels and by the head; and he has angry neighbours who are assuredly no fonder of him than of us. Our position is quite different, and it seems to me it would be difficult, or rather impossible, to make us give up what we have got."[2] But

[1] F. O. Papers. [2] Taillandier, p. 340.

Louis XV was tired of a war which kept him short of money; he had his predecessor's history to warn him; and he preferred to treat—"as a King and not as a tradesman"—on the basis of a restitution of conquests on both sides, irrespective of their value.

The war over, Saxe retired to Chambord, which the King had given him, and where he was allowed to have his regiment of uhlans. His restless activity found vent in drilling them, and in plays, banquets, and hunting parties; but he still dreamt of crowns. In 1749 he paid a visit to Dresden and Berlin. Frederic wrote to Voltaire: "I have had the hero of France here, that Saxon, the Turenne of the age of Louis XV. I have profited by his conversation, not in the French language, but in the art of war. That Marshal might be the teacher of all the Generals of Europe."[1] The year afterwards a neglected cold turned to a fever which carried him off in a few days. He died on 30th November, 1750, at the age of 54. His last words were: "Doctor, life is only a dream; mine has been a fine one, but short."[2]

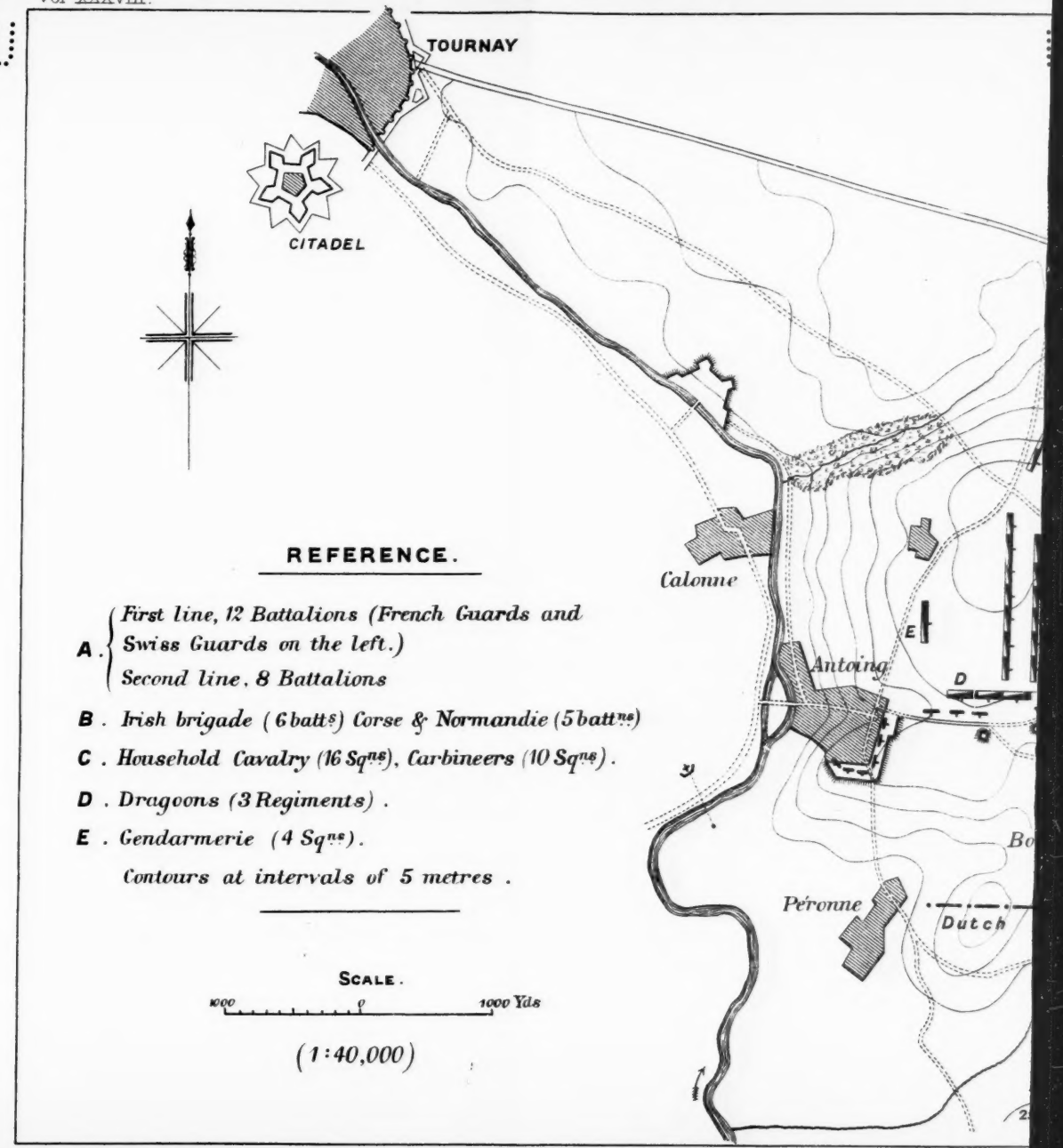
In estimating the position of Saxe as a General it has to be remembered that the middle of the last century opened a new chapter in the history of the art of war. The changes which Frederic, building on his father's foundation, made in the drill, equipment, and organization of his troops, and which other nations imitated, made it possible to play the game of war in a new and bolder fashion. Saxe must be judged by the tools he had to use. For instance, he may be charged with neglecting artillery, but the artillery of his day was horsed by contractors who could not be depended on, and the use of made-up cartridges was only just coming in. Guns interfered with mobility, and on mobility he rightly laid stress. On this account he cut down the artillery train, while helping to introduce battalion guns (light 4-prs.).

His cavalry played only a minor part in his battles, but the "Rêveries" show that this was not due to any want of appreciation of cavalry. It was due partly to its quality, for it shared in the general want of discipline, and partly to the character of the actions which that deficiency led him to choose. So with pursuit after victory. Lord Wolseley, in the "Soldier's Pocket Book," has quoted what he says about an officer charged with this duty: "He should attack, drive, pursue without intermission. All manœuvres are good in such a case; it is only the cautious ones that are worthless." Yet he was never able to put his theory in practice.

Voltaire, speaking of the storming of Berg-op-Zoom, says: "In pitched battles the French find their equals, and, sometimes, their superiors in military discipline; but they have none such in those sudden attacks in which impetuosity, agility, and ardour surmount obstacles in a moment." It was the care of Saxe to use the forte and not the foible of his weapon. He belonged to a time when war was waged with foils and not with sledge-hammers, and he was a consummate fencer.

[1] Taillandier, p. 385.

[2] The legend that his death was owing to a duel with Conti has been disposed of by Count Vitzthum.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Dutch
REFERENCE.
A. First line, 12 Battalions (French Guards and Swiss Guards on the left.) Second line, 8 Battalions
B. Irish brigade (6 batts) Corse & Normandie (5 battns)
C. Household Cavalry (16 Sqns), Carbineers (10 Sqns).
D. Dragoons (3 Regiments).
E. Gendarmerie (4 Sqns).
Contours at intervals of 5 metres.
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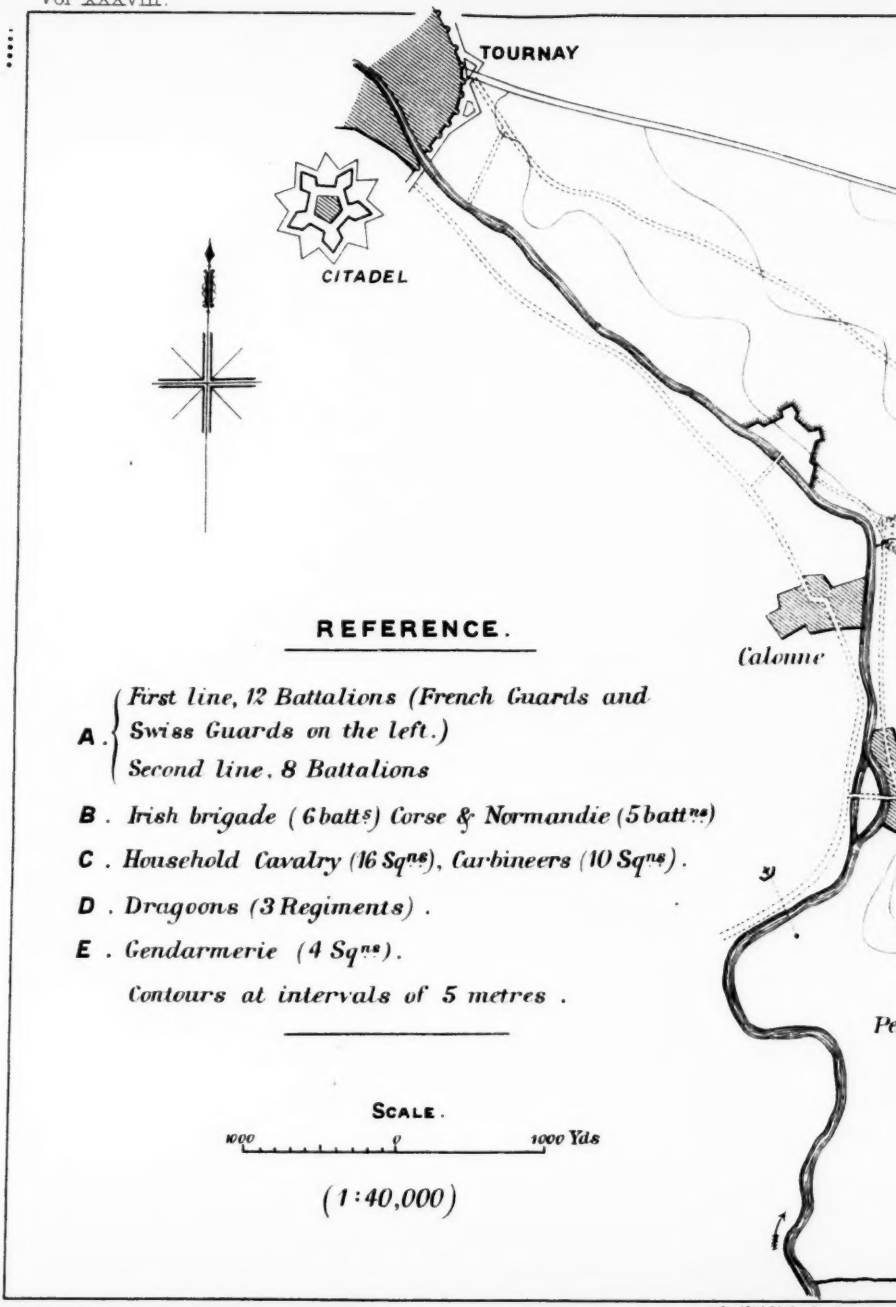
Journal R.U.S.Institution
Vol XXXVIII.



REFERENCE.

A. { *First line, 12 Battalions (French Guards and Swiss Guards on the left.)*
Second line. 8 Battalions

B. *Irish brigade (6 batts) Corse & Normandie (5 batts)*

C. *Household Cavalry (16 Sqns), Carbineers (10 Sqns).*

D. *Dragoons (3 Regiments).*

E. *Gendarmerie (4 Sqns).*

Contours at intervals of 5 metres.

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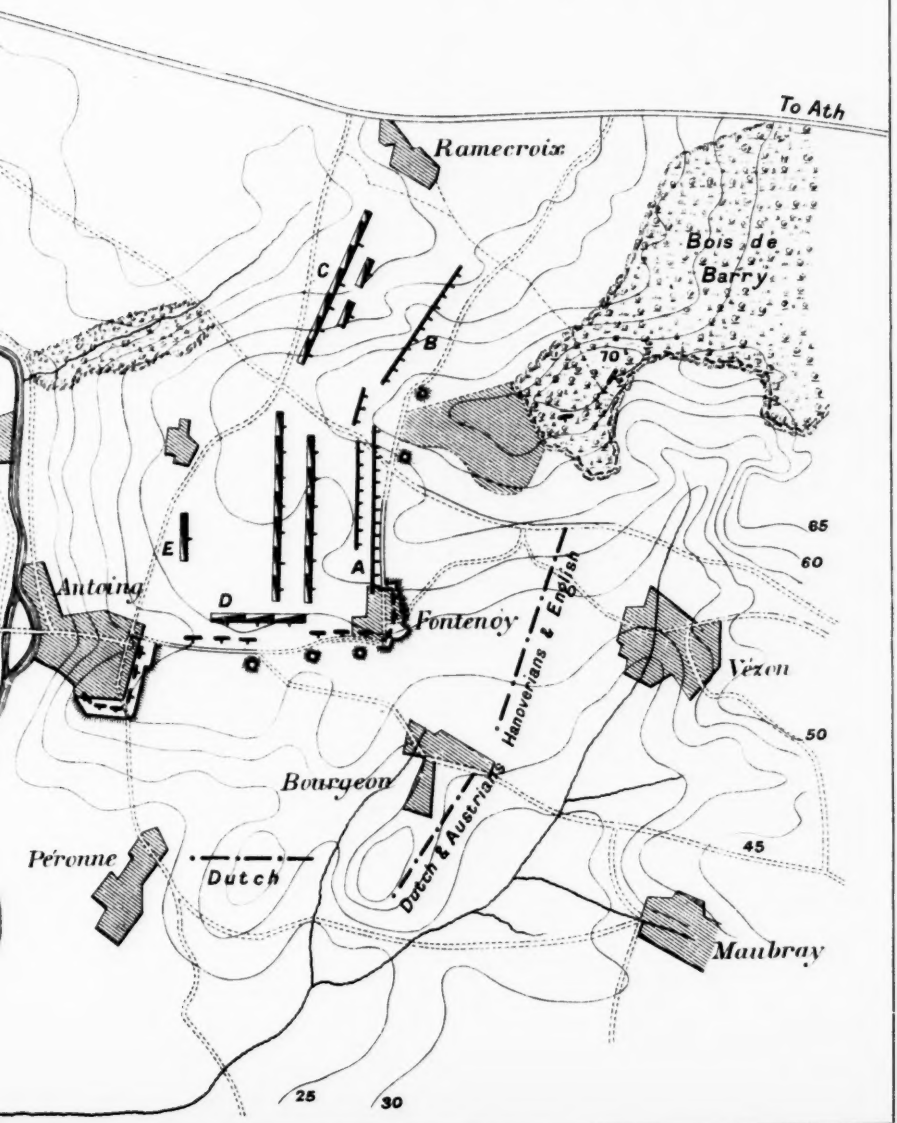
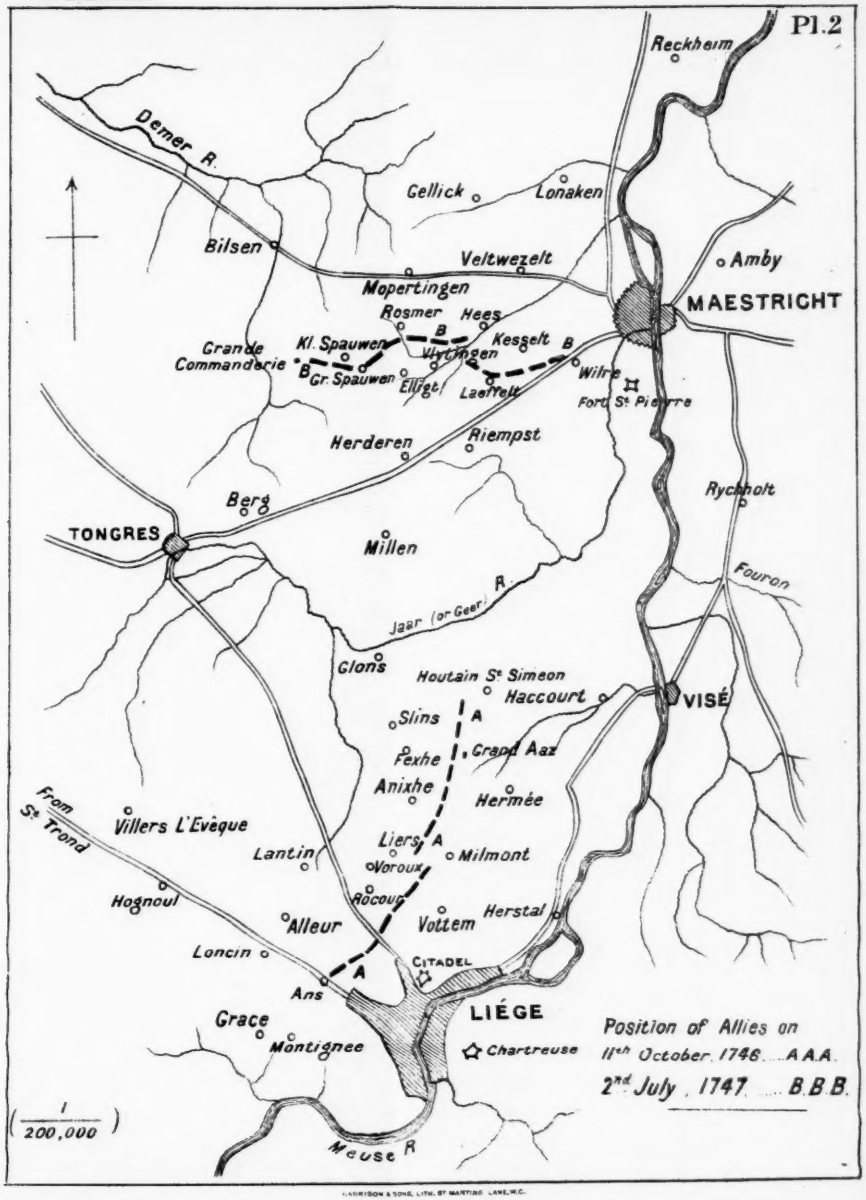


MARTINS LANE W.C.



HARRISON & SONS, LITH. ST MARTINS LANE, W.C.

NAVAL AND MILITARY NOTES.

NAVAL.

Home.—The following are the principal appointments which have been made: Rear-Admiral C. A. G. Bridge to be Commander-in-Chief on the Australian Station. Captains, W. C. C. Forsyth to "St. George;" Angus Macleod to "Gibraltar;" W. H. St. Clair to "Thunderer;" H.S.H. Prince Louis of Battenberg to "Cambrian;" M. P. O'Callaghan to "Philomel;" C. E. Gissing to "Grafton;" John Ferris to "Ruby;" G. F. King-Hall to "Volage;" and G. A. Callaghan as Naval Adviser to the Inspector-General of Fortifications. Commanders, H. R. Adams to "Pylades;" Conyers Lang to "Archer," and G. Richards to "Rambler."

The new 1st class cruiser "St. George" has been commissioned to relieve the "Raleigh" as flag-ship on the Cape Station. The Admiralty seem to be so satisfied with the result of the experiment in employing the new 1st class cruiser "Crescent" last spring to take relief crews out and to bring the time-expired men home from Australia, that, in addition to the "Crescent," which is now making her second trip to Australia with the new crew for the "Orlando," two other vessels of the same class are being employed on a similar service; the "Grafton" taking new crews to the Cape for the "Philomel," "Thrush," and "Penelope," while the "Gibraltar" takes out relief crews to China. This new system, which is now fairly inaugurated, is undoubtedly alike most important for the navy and advantageous for the country. Instead of the men being packed like herrings in a troopship, as was formerly the case, and deteriorating both in discipline and drill during the passage, the work of keeping them efficient goes on continuously both on the voyage out and home, while the Admiralty have at their disposal three 1st class cruisers, which in case of any emergency can be diverted by wire to any point where their services might be urgently required, and it is certainly much better for the ships themselves, that they should be thus employed, instead of being allowed to rust in the steam basins at home, as defects in engines and boilers can be discovered and remedied, and the machinery brought into smooth working order, before the ships are required for serious service. The 3rd class cruiser "Pylades" has been commissioned for service on the Australian Station, and has left for her destination. The "Boadicea," lately flag-ship in the East Indies, has arrived at Portsmouth, and will be paid off.

The 1st class cruiser "Edgar" and the 2nd class cruisers "Æolus" and "Spartan" have been ordered from the Mediterranean to China to strengthen the force under the command of Sir E. Fremantle in those waters, and the 1st class gunboats "Pigeon" and "Redbreast" have been transferred from the East Indies for the same purpose. The new 2nd class cruiser "Cambrian" has been commissioned for service in the Mediterranean, and has left for her station. Although the "Gibraltar" will have only a skeleton crew, her complement being completed by the new crews for the "Archer," "Linnet," and "Pheasant," it is understood that, if necessary, she will be retained on the China station, and it is presumed in that case, the relieved crews of the ships to be recommissioned will man her, and will have to remain out until the need for her services has passed.

Two more of the new 2nd class cruisers, the "Fox" and the "Forte," completed their trials last month. The "Fox" was built and engined at Portsmouth, and the result of the eight hours' run under natural draught was very satisfactory. Her machinery is designed to develop 7,000 horse power with the natural draught, but she exceeded this by 34·30, and her mean speed by patent log was 19 knots an hour. Her draught forward was 16 ft. 3 in., and aft 20 ft. 3 in., and the steam in boilers 143. She was not worked beyond 130 revolutions a minute. The coal consumption per indicated horse power per hour was 2·3 lbs. The result of the trial is regarded as highly creditable to the dockyard factory.

The four hours' run under forced draught was equally satisfactory. Her mean trim was 18 ft., and she was propelled with twin screws having a diameter of 13 ft. and a mean pitch of 17 ft.; the average boiler power amounted to 144·8 lbs., and the vacuum varied from 24·6 in. to 25·8 in. in the two sets of engines. Under these conditions, and with 139½ and 142 revolutions respectively, a collective indicated horse power of 9,063, or 63 beyond the specification, was obtained with 1·3 in. of air pressure, which gave a mean log speed of 20 knots. During the run a trial was made of Messrs. Cutmore's system for effecting audible voice-pipe communication between the bridge and the engine-room. The orders, notwithstanding the noise of the machinery, were distinctly heard.

The final trials of the "Forte" have also been successful. The ship was built and engined at Chatham, and during the four hours' run under forced draught, the engines developed 9,380 I.H.P., or 380 over the power for which they were designed, the corresponding speed having been 19·85 knots.

The old 3rd class battle-ship "Monarch," which has been repaired at a cost of something over 100,000*l.*, has also concluded the trials of her new engines and boilers. The ship has been re-engined by Messrs. Maudslay, Sons, and Field with vertical triple expansion engines, designed to develop 6,500 I.H.P. with natural draught, and 8,000 I.H.P. under forced draught. During the four hours' run under forced draught the engines developed 8,210 I.H.P., the speed obtained being 14 knots, the steam pressure in the boilers being 152·6 lbs. to the square inch, and the revolutions 86·5 per minute. As no attempt has been made to modernise her armament, and she still retains in her turrets her obsolete 25-ton muzzle-loading guns, it is difficult to understand why this large sum has been spent on her, and, if such a sum was to be spent, it is still more difficult to understand why, even at some further additional cost, some method could not have been devised by which at least four of the 9·2-in. 22-ton B.L. guns could have been substituted for her obsolete muzzle-loaders, as, in spite of her low speed, she would then have been of some value as a fighting ship. It may also be well to recall that very lately the Austrian battle-ship "Tegetthoff," one of an old type with a single screw, was successfully reconstructed, twin screws with modern engines replacing the single screw, and no difficulty appears to have been found in effecting so radical a change, while the result has been to make the vessel a handy fighting ship with an increase of speed of 2 knots, which has turned her from a 14 into a 16 knot ship. Whatever the reason may be, outsiders will fail to understand why our Constructors Department, when spending such enormous sums, as has been done on the "Monarch" and "Sultan," could not have seen their way to effect a similar change in their propelling machinery.

The following interesting description of the new aluminium 2nd class torpedo-boat, which Messrs. Yarrow and Co. have constructed for the French Government, is taken from the columns of the "Times." The boat was taken out on the 29th September for a brief trial, in order that certain engineers, naval officers, and others not officially connected with the vessel, might have an opportunity of observing her performance. The boat is of the 2nd class, being 60 ft. long and 9 ft. 3 in. wide, a beam 1 ft. 9 in. in excess of the older type of 2nd class boat. The chief interest naturally centres in the hull, the machinery consisting of an ordinary set of three-stage compound torpedo-boat engines and a Yarrow water-tube boiler. In design the vessel is on the same general lines as the 2nd class boats recently

built by this firm, but the adoption of a lighter material has enabled important alterations to be made in the structure. As compared to a steel boat of the same type, the scantling has been thickened about 25 per cent., in spite of which the total weight of the hull has been reduced about 50 per cent. The builders had the boat weighed when slung on a crane in the docks, the total weight with water in the boiler being 9 tons 8 cwt. Towards this total the hull itself contributed 2 tons, so it may be taken that an ordinary steel 2nd class torpedo-boat's hull weighs 4 tons. The material of which the hull is constructed is, of course, not pure aluminium, but an alloy consisting of 94 per cent. of aluminium and 6 per cent. of copper. A large number of experiments have been made by Messrs. Yarrow and by the French Government, the results of which point to the proportions adopted being found best for the purpose.

The chief result of using the lighter metal has been that a speed of over 20½ knots was obtained on the official trial, carried out on September 20 under the supervision of a French Naval Commission, of which Captain Le Clerc, of the French Navy, was president. The *maximum* speed of torpedo-boats of this class in the British Navy is about 17 knots. As this is a record boat, it will be interesting to quote the leading particulars from the report of the official trial. A run of two hours' continuous steaming was made in the estuary of the Thames. The weather was calm. The number of persons on board was 17; and the total load 3 tons. Observations on six runs on the measured mile:—Average boiler pressure, 181 lbs.; vacuum, 24 in.; average air pressure for forced draught in stokehold equal to 1½ in. of water; mean revolutions, 591 per minute; mean speed, 20·503 knots. On the whole run of two hours, however, the speed was somewhat better, the engines making a total number of revolutions of 70,948, the corresponding speed for which would be 20·558 knots. The report adds, that "The boiler made ample steam without priming, and the engines worked without any heating." It is also stated that "vibration was not appreciable." The power exerted is not mentioned in the report, but it was stated to be over 300 horse power.

It will be seen that by using aluminium in place of steel in the hull construction—for in other respects the boat is on known lines—an increase of speed of 3½ knots has been obtained, in addition to which there are other subsidiary, but by no means unimportant, advantages dependent upon the decrease in weight of hull structure. Among these are ease in lifting, additional buoyancy, and freedom from vibration. The latter feature is really remarkable in the new boat, which steams at her highest speed with a degree of vibration, to quote the report of the official trial, "not appreciable;" in fact, when running at her best speed the boat was so steady that one could make notes in the after-cabin with facility. Those who are acquainted with the performance of the average torpedo-boat when running at speed will appreciate the great advance that has been made in this essential feature, for excessive vibration does much to reduce the efficiency of these high-speed craft as engines of war. No doubt the greater steadiness of this boat is largely due to the improvements in engine balancing introduced of late, but Messrs. Yarrow and Co. attribute it chiefly to the increased scantling and the non-resilience of the alloy used when it is manufactured in the manner requisite for producing ship plates and angles—for aluminium is among the most resilient of metals when treated in some ways. The saving in weight is of increased importance in the 2nd class boats which are designed to be carried on the larger battle-ships. The greater buoyancy of the craft was very noticeable on Saturday last, when there was a smart breeze blowing, and in the lower reaches of the Thames, and where it met the tide there was quite sufficient sea to show off the paces of the little vessel, which appeared to jump from wave to wave rather than drive through them. There is also an advantage in the use of aluminium in regard to facility in taking the ground. The alloy Messrs. Yarrow have used has a tensile strength of 14 tons to the square inch, and has a very high elastic limit, the ratio of elastic limit to tensile strength being higher than in the case of steel. In the construction of vessels it is the elastic limit of the material that largely governs the scantling—that is, the substance worked into the structure—for it is evident that damage begins as soon as the yielding limit is passed. Also, in a steel vessel, ample tensile strength could be obtained though the structure were so slight as to retain insufficient rigidity to

keep its shape. In this respect mere bulk, divorced from weight, becomes a virtue, and it is largely this which has enabled wood to hold its own, so far as it has done, in the construction of small craft.

The physical advantages of the aluminium alloy are, indeed, manifest, but when we turn to the financial side of the question we find the engineer's arch enemy in ascendant. Mr. Yarrow states that the price of the material for the hull and fittings varied from 3*s.* to 5*s.* per lb., and the metal used in this little boat cost over 1,000*l.* If a torpedo-destroyer like the "Havock" or the "Hornet" were built of aluminium, in place of steel, more than twice as much money would be required for the construction, and naturally this increase in price rises in a vastly-increasing ratio as the vessel grows in size. It is a question for the naval strategists to decide whether they will have two destroyers at, say, 26 to 28 knots, or one at 30 to 32 knots, putting aside the other advantages of lighter hull structure.

All the aluminium plates and angles for this torpedo-boat were obtained in France. There is no doubt that in this country we are not equal to foreign competitors in the production of aluminium; but this fact is largely due to natural causes. As is well known, the metal is one of the most widely distributed and most plentiful constituents of the earth's structure, but it is extremely difficult to detach from those substances with which it is combined in nature. It oxidizes slowly at ordinary temperatures, but with extreme rapidity when subjected to great heat, and for this reason the electric arc is used in its reduction. Cheap motive power is, therefore, the key to its economical production, and the cheapest motive power existing is the hitherto potential energy of natural waterfalls—that is, potential as far as economic uses are concerned. In various parts of the world advantage is now being taken of these supplies of power; perhaps the most striking is the utilization of Niagara. In connection with this scheme a large installation is in progress for supplying electricity in order to manufacture aluminium. As knowledge grows, and as works utilizing natural power multiply, aluminium may take a prominent place as a material for marine construction; but, in spite of its manifest structural advantages, there must be vast changes, and probably a long period of time will elapse before it deprives steel of its premier position, excepting in the case of small war vessels or costly yachts.

We are informed, on reliable authority from Liverpool, that the qualification of officers joining the Cunard Company's service are to be in future (1) that they should hold a master's certificate, and (2) that they should have held command of a sailing or steam-ship, *or* that they should have served for 12 months in the Royal Navy as R.N.R. lieutenants. This includes sub-lieutenants R.N.R., as officers of this rank are always appointed to H.M. ships for training as acting lieutenants.

France.—The following are the principal appointments which have been made:—Vice-Admirals Regnault de Presmenil as Member of the Council of Works, and Perrayon Prefect of the 3rd Arrondissement Maritime (Lorient). Capitaines de vaisseau—Manceron to "Suffren," Gigon to "Courbet," Fort to "Magenta," and Borel de Brétezel to the Committee of Inspector-Generals of the Navy.

("Le Moniteur de la Flotte.")

The 1st class cruisers "Alger" and "Isly" have been detached from the Active Division of the Mediterranean and Channel Squadrons respectively to strengthen the force in China under the command of Admiral Dupuis; the 2nd class barbette-cruiser "Duguay-Trouin," bearing the senior officer's pennant of Capitaine de Vaisseau Courrejolles, commanding the Naval Division in the Pacific, has also been ordered from Callao to China, where Captain Courrejolles on arrival will assume the duties of second in command, while the 3rd class barbette-cruiser "Beautemps-Beaupré" from the Atlantic Division has also proceeded to the same station; these additional ships will more than double the squadron under the command of Rear-Admiral Dupuis, which previously consisted only of the cuirasse-de-croisière "Bayard" (flag-ship), the 3rd class barbette-cruiser "Forfait," the aviso "Inconstant," and the gunboats "Lion" and "Comète." There are further

in reserve at Saigon the cuirasse-de-croisière "Triomphante," the armoured gunboat "Styx," the gunboats "Lutin" (to be immediately commissioned), "Aspic," and "Vipère," and some smaller vessels. The despatch-vessel "Dumont-d'Urville" has been commissioned to reinforce the squadron at Madagascar; she is of an old type and heavily rigged for her size, and is said to sail remarkably well, with a strong fair wind making more under sail than she can do under steam. ("Le Moniteur de la Flotte.")

The new 2nd class cruiser "Suchet" was fully commissioned on the 1st October, and has joined the Active Division of the Mediterranean Fleet. The old battle-ships "Trident" and "Océan," specially commissioned for training the Reservists in the summer, have been placed in the second category of the reserve at Toulon, and the "Duguesclin" in the third, only such stores being left on board as will not deteriorate, they will, however, remain completed with coal. The torpedo-cruiser "Vautour" has been transferred from the Active to the Reserve Division of the Mediterranean fleet and placed at the same time *en disponibilité armée*. The new torpedo-boat, No. 182, lately completed at Havre, by M. Normard, has finished her trials at Cherbourg. She is 118 ft. long, with a beam of 13 ft. 2 in., has a displacement of 80 tons, engines of 1,000 I.H.P., and averaged during a four hours' run 24 knots. She is to be attached to the Défense Mobile, at Brest. The trials of the new torpedo-cruiser "Fleurus," which have been taking place at Cherbourg, are now nearly completed; at her last preliminary trial under forced draught the engines developed 3,936 I.H.P. with 130 revolutions, giving a speed of 18 knots. M. Weyl points out that she is a ship completely out of date before she is ready for commissioning, and that, although she is powerfully armed, the guns are so crowded together, one projectile would be enough to put several out of action and destroy the crews. The new 2nd class cruiser "Friant" has been continuing her trials at Brest, but has had some trouble with her boilers; she has, however, already developed the necessary I.H.P. of 9,000, which with 130 revolutions gave a speed of 19·7 knots, a quarter of a knot in excess of the contract speed; but her evaporators seem to be giving some trouble. The trials of the new torpilleur-de-haute mer, "Lansquenet," have at last been completed, but the high speed of 27 knots, which was confidently expected from her, has not been realised, as she has barely averaged 24 knots. She is, however, a useful vessel; she has four boilers, and with one has easily maintained a speed of 13 knots, with two 16 knots, and with natural draught with four boilers a speed of over 20 knots with a small consumption of coal. The "Lansquenet" now proceeds to the Mediterranean, where she will be attached to the Active Division of the Mediterranean fleet. The new coast-defence battle-ship "Bouvines" has been put in commission at Toulon for her trials; she is a vessel of the same type as the "Jemmapes," which has been undergoing her trials at Brest, and has been built by the Société des Forges et Chantiers de la Méditerranée, at La Seyne.

("Le Moniteur de la Flotte" and "Le Yacht.")

A terrible boiler explosion took place at Brest about 11 o'clock on the morning of the 27th ultimo on board the cruiser "Aréthuse," while her engines were being tested in the arsenal. Four men were killed, and about 20 others were more or less seriously injured. The vapour escaped in such quantities that it was at first imagined the vessel was on fire. The vessel was stationary, but some part of her machinery was being tested. So far as can be ascertained, a supply steam pipe in the aft engine-room burst during the experiments. This led to an outbreak of fire, and the clouds of mingled steam and smoke prevented many of the engineers and stokers who were not injured by the actual explosion from making their escape. For the same reason the imprisoned men could not be rescued from above. Every available hand was set to work without loss of time to extinguish the flames and save those in the engine-room from the horrible death which threatened them.

The crew of the "Aréthuse" were aided by sailors and marines from the other ships in the fleet. In a short time the fire was got under by their combined efforts, and, with considerable difficulty, the dead and injured were carried on deck. Of

the six who perished three were engineers and three stokers. Their bodies were fearfully disfigured. The injured number about 20. They were at once taken to the naval hospital here.

According to further particulars that have been since obtained regarding the explosion on the "Aréthuse," there were 40 engineers and stokers in the engine-room when the steam pipe burst. Those who were not immediately enveloped in the scalding steam were able to reach the deck. Ten, however, were left behind in the engine-room, and half an hour passed before they were rescued. One of these men, a master engineer, was still living when he was brought on deck, but he expired about 5 o'clock. His son, an engineer's apprentice, was with him in the engine-room at the time of the disaster, but was saved.

It now appears that the pumps were set to work, not to extinguish an outbreak of fire, but in order that the cold water might cool and condense the thick steam, it being impossible to enter the engine-room until this had been done.

To meet the exigencies of the Budget, the effectives of the French Mediterranean Reserve Squadron and of the 1st Division of the Northern Squadron, which were placed *en disponibilité* on October 1, will be reduced, as far as possible, without violating the principle of Reserve forces established a few years ago. Moreover, in case the political developments in Madagascar should call for a further supply of seamen in those waters, they will be drawn from the Reserve Squadron in the Mediterranean. It is possible that the constitution of this squadron, in relation to the battle-ships, cruisers, and smaller craft which it now includes, may be modified, and that some administrative changes may be introduced with the view of effecting economies, but the maintenance of the squadron, with its staff, under the command of a Vice-Admiral, with a Rear-Admiral as second in command, is fully decided upon. ("Le Temps.")

The 2nd class protected cruiser "Descartes" was successfully launched on September 27 at the yard of the Société des Ateliers et Chantiers de la Loire, St. Nazaire. She is a sister ship of the "Pascal," which is building at Toulon, and has been on the stocks since 1892. She displaces 3,880 tons, and measures 315 ft. 6 in. in length, by 42 ft. 4 in. in beam. Her Belleville boilers and engines of 8,000 horse-power are expected to give her a speed of 19 knots. Her steel deck is 1½ in. thick, but she has good protection in her coal bunkers. The armament will consist of two 6·2-in., ten 3·9-in. quick-firing, and fourteen 3-pr. quick-firers, as well as eight 1-pr. machine-guns, and four torpedo ejectors. She is built wholly of steel, but the hull is covered with teak and coppered. ("Le Yacht.")

The four new armoured cruisers "Latouche-Tréville," "Charner," "Chanzy," and "Bruix" are each to be fitted with electrical machinery for the loading and elevating of their guns and the training of their turrets. The machinery of the first named is now completely installed. It is somewhat similar to that which was fitted two years ago by the Société des Forges et Chantiers de la Méditerranée in in the Chilian armoured battle-ship "Capitan Prat," but great improvements have been effected. Each turret can be revolved with the utmost ease by the officer in charge of it, and the effect of his touch on the controlling button is instantaneous. Each of the cruisers has eight turrets: two, placed respectively forward and aft, contain each one 19-cm. (7·4-in.) gun; the remaining six, placed three on each broadside, contain each one 14-cm. (5·8-in.) Q.F. gun. Electrical machinery of a similar kind is being fitted in the new battle-ship "Jauréguiberry," and is to be fitted in the new 1st class cruiser "D'Entrecasteaux." ("Le Yacht.")

Germany.—The following are the principal appointments which have been made:—Rear-Admirals—Hoffmann to command of Cruising Squadron in the East, Barandom to command of 2nd Division of Manœuvre Squadron. Captains—von Prittwitz for service at the Ministry of Marine, vice Rear-Admiral Hoffmann; Bendeman as Inspector of the Torpedo Department. Corvette-Captains—Brocker to "Condor," Meuss for service at the Ministry of Marine, Graaf von Moltke

(Friedrich) to command of the 1st Sub-Division of the 2nd Seamen's Division, Brinkmann to "Cormoran," Wittner to command of central ship of Reserve at Danzig, Walther to "Sperber," Oelrichs to "Gefion."

("Marine-Verordnungs-blatt.")

We regret to have to announce the death of Vice-Admiral von Henk, who died at Berlin on the 20th ult. The deceased Admiral served as a lieutenant for some three years in the English Navy, 1857–60, and of late years has been a well-known writer on naval subjects.

The Manœuvre Squadron has been reorganized, and now consists of the following ships. 1st Division:—

Battle-ships—"Kurfürst Friedrich Wilhelm," flag-ship of Commander-in-Chief.
"Brandenburg," "Weissenburg," "Wörth."
Dispatch-vessel—"Wacht."

2nd Division:—

Battle-ships—"Baden," flag-ship of Rear-Admiral Diederichs.
"Bayern," "Sachsen," "Württemburg."
Dispatch-vessel—"Pfeil."

The squadron is thus the strongest yet commissioned for ordinary service, the 1st Division consisting as it now does of the four new powerful battle-ships of the "Brandenburg" class. Vice-Admiral Koester remains in command, with Captain Fischel as his Chief of the Staff, and Captain Boeters as Captain of the flag-ship.

("Marine-Verordnungs-blatt.")

The 2nd class cruiser "Irene" was commissioned on the 1st instant, and proceeds to China as the flag-ship of Rear-Admiral Hoffmann, who has already left for his station, and will temporarily hoist his flag on board one of the other ships of the squadron. The "Irene" is a vessel of 4,400 tons displacement, has engines of 8,000 I.H.P., and can steam 18 knots. The new 3rd class cruiser "Cormoran" has also been commissioned for service in China. The squadron on that station now consists of the 3rd class cruisers "Alexandrine," "Arcona," and "Marie," and the gunboats "Iltis" and "Wolf." The new 3rd class cruiser "Condor" has been commissioned to strengthen the squadron on the East Coast of Africa. The four seagoing training-ships have all left for their winter cruise. The cadet training-ships "Stosch" and "Stein" have gone to the West Indies, as has also the boys' training-ship "Moltke," while the remaining boys' training-ship "Gneisenau" winters in the Mediterranean. All four of these vessels are admirably suited for their work, being full-rigged, commodious, composite-built, spar-decked frigates of the old type, providing ampler and more comfortable accommodation for officers and men than can be found in the four corvettes devoted to the same work in the English Navy.

("Kreuz Zeitung.")

The Kaiser seems this year to have been extremely pleased with the state of the ships employed in the Autumn Manœuvres, and with the way in which the Manœuvres were carried out. At the conclusion of the operations, he addressed a congratulatory letter to Admiral Baron von der Goltz, who had conducted them. His purpose in inspecting the fleet, he said, was to see how far, in accordance with his orders, attention had been paid to the development and elucidation of the conditions of fleet command, which will be at once called for in case of war, and how far this had "entered into the flesh and blood" of the fleet. The Emperor had convinced himself that considerable progress had been made both in strategy and tactics, and that the commanders had gone to work in the right way. He was glad to express his acknowledgment of the untiring energy which had been devoted to the solution of these questions. Opinions differed very widely on such subjects, and without experience in war it was a difficult task to arrive at principles. "But I see," the letter continued, "that you have already succeeded, by a union of views,

in securing a good basis, especially in the matter of tactics. You have made a considerable advance on that way which I urged upon you from my heart in the winter of 1891–92. I am sure that all concerned will continue to co-operate unanimously towards the solution of the many and difficult problems which remain to be treated. The handling of the fleet gave me great satisfaction, and all that I saw I found to be well thought out and practical. The crews manifested great zeal and intelligence in the execution of their tasks. I must refer with especial satisfaction to the excellent way in which the ships of the first division worked together. They have attained a perfection which I have not seen previously in my fleet, and I recommend all the other commanders to strive and emulate their example. You are further to make known to the Admirals, officers, and men my complete appreciation of their efforts during the Autumn Manœuvres, and to convey my satisfaction and express my thanks to them for their devotion." ("Militär Zeitung.")

The silver centre-piece given by the Emperor as a prize for the best heavy gun practice was won by the battle-ship "Sachsen," commanded at the time by Prince Henry of Prussia. It will be kept in the officers' mess place.

The monument put up by the Kaiser in the naval garrison church at Kiel, in memory of the officers and men who lost their lives on the occasion of the boiler explosion on board the battle-ship "Brandenburg," in the early part of the year, was unveiled with great ceremony by Prince Henry on behalf of the Emperor on the 24th September. Addressing the assembled officers and men after the religious ceremony, H.R.H. said, "Comrades, this is both a solemn and a joyful moment for us: solemn, because we call to mind the death of so many brave men; joyful, because we see how His Majesty our gracious War-Lord (Kriegs-Herr) cares for his navy, recognizes its energy even in the most minute details, and knows how to reward its devotion to duty. I will repeat to you the exact words used by His Majesty the Kaiser, when he received the news of the disaster on board the 'Brandenburg': 'I consider that the men have not died on the "Brandenburg," but have found the death of heroes on the field of honour.' May this monumental tablet, which His Majesty has placed here in memory of the devoted men who died on the 'Brandenburg,' serve for all time as an exhortation to unswerving conscientiousness and devotion in the discharge of duty in His Majesty's service. By command of the Emperor and King, I now make over the charge of this monument to the Church." ("Kreuz Zeitung.")

On October 15 the 3rd class cruiser "F," of the "Bussard" type, was launched at Wilhelmshaven. She belongs to the programme laid down in the year 1888-89, and is one of the four new ships of the type of which the "Falke" and "Cormoran" are afloat. "F" was delayed by the refusal of credits in 1892, but in the next financial year grants were made which enabled her to be laid down. Her displacement is 1,640 tons, her length 246 ft., her beam 33 ft. 6 in., and her mean draught 15 ft. Her engines are to develop 2,800 horse-power and give a speed of 16 knots. The armament will consist of eight 3·96-in. quick-firers, four machine-guns, and two torpedo-tubes. She is a steel composite-built ship, intended for service on distant stations; she carries 300 tons of coal, which, at 10-knot speed, gives her a radius of action of 5,200—5,500 miles. The vessel was christened the "Geier" on behalf of the Emperor by Vice-Admiral Valois, the Commanding Admiral of the station. At the same dockyard the keel plates of the 1st class battle-ship which is to replace the old "Preussen" will be laid down. She will be of the "Wörth" type, but with considerable modifications, and will carry four 11-in. 40-calibre guns, and two of the same calibre shorter, as well as six 3·9-in. and eight 3·4-in. quick-firers, with some smaller pieces and machine-guns.

It is proposed to constitute two new naval reserve divisions out of the new coast defence ironclads of the "Siegfried" class: one division is to be stationed at Danzig, and the second at Kiel: this last division is to be charged specially with the duty of protecting the new canal between the North Sea and the Baltic and the mouths of the rivers flowing into the North Sea. ("Nord-Ostsee Zeitung.")

Italy.—The following important changes have been made in the higher ranks of the navy:—Vice-Admirals, Bertilli (late President of the Superior Council of

the Navy), Nocc (lately commanding at Venice), and Acton (Member of the Superior Council) have been placed on the retired list ("Posizione di servizio ausiliario") at their own request; Vice-Admiral Canevaro and Rear-Admiral Corsi have been relieved of their appointments as Members of the Superior Council of the Navy; Rear-Admiral Albini has been placed on the retired list at his own request. ("Gazzetta Officiale.")

It is further stated that Rear-Admiral Corsi, on promotion to Vice-Admiral, will succeed Vice-Admiral Labrano in command of the 2nd Maritime Department (Naples), and Rear-Admiral Magnaghi, also to be promoted, will be appointed to the vacant command of the 3rd Maritime Department (Venice): that Rear-Admiral Palumbo, at present in command of the Training Squadron, will relieve Rear-Admiral Marra as Superintendent of the Arsenal at Spezzia: and Captain Grillo, to be promoted to Rear-Admiral, will succeed Admiral Magnaghi in command at Maddalena. ("La Tribuna.")

The 3rd class protected cruiser "Calabria" was launched at Spezzia on the 20th September. Her dimensions are as follows:—Length, 260 ft.; beam, 39 ft.; and with a mean draught of 16 ft. 3 in., she has a displacement of 2,467 tons. Her engines are to develop 4,000 I.H.P. under natural draught, and 6,500 under forced, giving a speed of 18 and 19 knots respectively. Her armament consists of four 6-in., six 4·7-in., eight 6-pr., twelve 1·1-pr., all quick-firing, and two torpedo-tubes. She has a 2·2-in. steel protective deck, a double bottom, and cofferdams all round the water-line filled with cellulose, while her coal supply will be 500 tons, and she will have a crew of 240 officers and men. Her bottom is sheathed with wood and zinc, to fit her for service on distant stations. The old armoured frigate "San Martino," which was launched in 1863, is, it is stated, to be used as a torpedo school ship. ("La Gazzetta Piemontese.")

The Minister of Marine, Admiral Morin, has given instructions that the construction of the new 1st class battle-ship "Emanuele Filiberto," and the new armoured cruiser "Vettor Pisani," is to be pushed on with all possible despatch.

The ceremony of consecrating the standard presented by the ladies of Genoa to the new battle-ship "Re Umberto" took place at Genoa on the 14th ult., with much pomp, the whole town being *en fête* for the occasion. The Minister of Marine was present as the representative of the King, and a fleet drawn from the Permanent, Reserve, and Training Squadrons, under the command of Vice-Admirals Racchia and Accinni and Rear-Admirals Puliga and Palumbo respectively, was assembled to do honour to the occasion. The following ships were present: Battle-ships—"Re Umberto," "Lepanto," "Doria," "Sardegna," "Ruggiero di Lauria," "Italia," and "San Martino;" ram-torpedo-cruisers—"Stromboli" and "Lombardia;" torpedo-cruisers—"Aretusa," "Iride," and "Euridice;" torpedo-avisos—"Aquila," "Nibbio," and "Sparviero;" 14 torpilleurs-de-haute-mer, and the training frigate "Vittorio Emanuele," and the corvette "Flavio Gioia." The festivities in honour of the event and the fleet lasted three days. ("L'Italia Militare e Marina.")

During his late tour of inspection, the Minister of Marine, when at Spezzia, took the opportunity of the presence of the Reserve Squadron, under Vice-Admiral Accinni, to have some important exercises by the torpedo-boats carried out against different ships of the squadron; the "Re Umberto" and the "Doria" were the two vessels selected to defend themselves, while the attack under different conditions was made by 20 torpedo-boats, supported by the "Italia," "Aretusa," and "Urania;" the attack was boldly and skilfully carried out in each case, but the two battle-ships were considered to have succeeded in successfully defending themselves. At Tarentum a minute inspection was made of the works being carried out at the arsenal and dockyard, visits being paid to the new 160-ton crane, the large naphtha depôts, and the new coaling quay, which is 2,000 ft. long, with a depth of water alongside it of 39 ft., and on which there is storage space for 100,000 tons of coal. A visit was then made to the important fortifications of the harbour,

which includes, among other defensive works, two 120-ton guns mounted in a heavily armoured turret, constructed on the same principles as the huge turret "Umberto I" at Spezia. ("L'Esercito Italiano.")

In accordance with the new organization adopted by the Minister of Marine, the staff appointments of two Vice-Admirals and four Rear-Admirals will be suppressed, and a Royal Decree sanctioning the reorganization of the Superior Council of the Navy has been issued. Up to the present time the Council has been composed of four flag officers, an inspector of naval engineering, and a civil official selected from the personnel of the Ministry. An economy is to be effected by no longer maintaining the four Admirals permanently in the capital, and the Council will henceforth consist of the Under-Secretary of State for Naval Affairs, the three Directors-General—of the personnel, the Naval Constructive Department, and the Department of Artillery and Armaments—the Chief of the Staff, and a civilian director. With these may be associated, as extraordinary members of the Council, the Director-General of the mercantile marine, the Inspector-General of naval engineering, the Medical Director-General, the head of the military engineering staff, the chief of the victualling department, and the Admirals holding independent commands of the sea forces of the kingdom.

Admiral Morin has further introduced a new system of classification, by tonnage displacement, for the ships of the fleet, and the distinctive terms "Corazzata," "Incrociatore," "Ariete-torpediniere," &c., in use up to the present, have been abolished. The first of the new categories comprises the "fighting ships" (navi da battaglia), divided into seven classes, and includes all battle-ships, cruisers, torpedo-ram and torpedo-cruisers: 1st class, vessels of over 9,000 tons; 2nd, vessels of from 6,000 to 9,000 tons; 3rd, vessels from 4,000 to 6,000 tons; 4th, vessels from 3,000 to 4,000 tons; 5th, vessels from 2,000 to 3,000 tons; 6th, vessels from 500 to 2,000 tons; 7th, vessels below 500 tons.

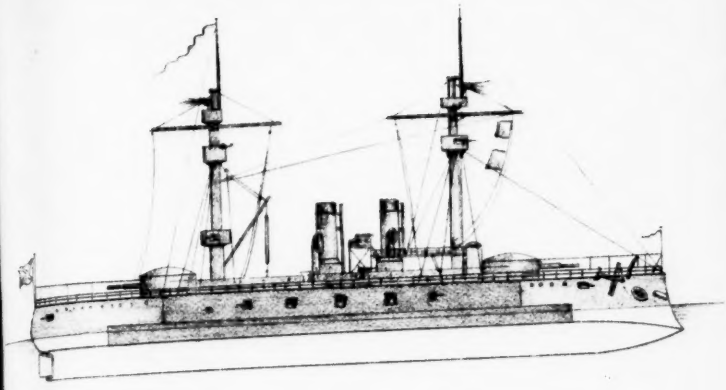
2nd category comprises all torpedo-craft (torpediniere) divided into four classes: 1st, vessels of over 100 tons; 2nd, vessels from 60 to 100 tons; 3rd, from 30 to 60 tons; 4th, all boats below 30 tons.

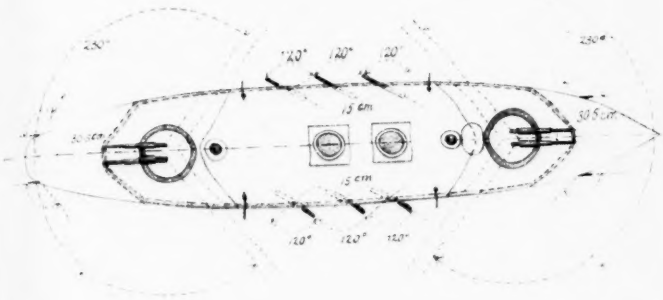
3rd category comprises subsidiary vessels (navi sussidiare), also divided into four classes: 1st, vessels over 4,000 tons, such as the troopships "Trinacria" and "Eridano," &c.; 2nd, vessels from 2,500 to 4,000 tons, such as the gunnery and torpedo school-ships "Formidabile" and "Terribile," &c.; 3rd, vessels from 1,000 to 2,500 tons, such as the dispatch-vessels "Rapido," "Cariddi," &c.; 4th, vessels below 1,000 tons, as the "Garigliano," "Castore," &c., vessels, in fact, of little fighting value.

4th category comprises vessels for harbour service and school-ships (navi d'uso locale nei porti militari), &c. ("L'Italia Militare e Marina.")

Russia.—Captain Rogestwensky, lately Naval Attaché in London, has been appointed to the command of the armoured cruiser "Vladimir Monomakh," which has been commissioned to strengthen the Russian squadron in the East.

We mentioned in the July Notes the launch of the new battle-ship "Sisoi Velikie;" we are now able to give some fuller details (Plate 56) of the vessel. The ship's hull is of steel manufactured in the Ishora works at Kolpino, and has the usual double bottom, bulkhead, and cellular subdivision, there being, in all, 217 compartments. Her total length is 348 ft., the length at the water-line being 341 ft., and between perpendiculars, 329 ft.; she has a beam of 66 ft. 6 in., and, with a displacement of 8,880 tons, will have a draught forward of 21 ft. 3 in. and aft of 24 ft. The ship's sides are vertical, and she is 18 ft. forward out of the water and 17 ft. aft. The horizontal steel deck is 3 in. thick, the centre being 2 ft. 1 in. above the water, while the sides extend 4 ft. 10 in. below. Rising from the lower edge of the armour-deck is the steel partial belt, 247 ft. long, 17·6 in. thick, and with a depth of 7 ft.; above comes a second casemate 195 ft. long, protected by 5-in. armour, while yet a third, somewhat shorter, but with the same thickness of armour, protects the auxiliary armament; the ends of the casemates are shut in by





PROFILE AND DECK PLAN

OF

THE NEW RUSSIAN BATTLESHIP "SSYSSOI VELIKIE"

5-in. transverse bulkheads. There are two turrets, one forward and one aft, each protected with armour 17·6 in. thick; they have a diameter of 34 ft. 9 in., and are 10 ft. 6 in. high. The armament consists of four 30·5-cm. (12-in.) 40-calibre long Oboukhoff guns, two in each turret, the muzzles of the guns being 24 ft. above the water-line. The auxiliary armament consists of six 15-cm. (6-in.) guns, and 18 smaller Q.F. guns; the 15-cm. and four of the Q.F. guns are in the armoured casemate, the remaining Q.F. guns are on deck and in the fighting tops. There are six torpedo-discharges.

The triple-expansion engines are to develop 8,500 I.H.P., giving the ship a speed of 16 knots. There are 12 Belleville water-tube boilers, placed in three separate stokeholds; both the engines and boilers were constructed at the Baltic works. The ship will carry 550 tons of coal, which, at 10-knot speed, will give her a radius of action of 5,000 miles.

The "Sisoi Velikie" is the fourth ship to be so called in the Russian Navy. The Empress Catherine the Great ordered a ship of the line to be christened by that name to commemorate the victory of the Russian Fleet over the Swedish near Hochland Island, on the 6th July, 1788, which was the feast-day of the Saint of that name; she was a vessel of 74 guns, was built at Archangel, and after taking part in several actions, was destroyed in 1803. The second "Sisoi" was also a 74-gun ship, built in 1822, but for some reason or another seems to have been soon struck off the Active List. A third 74-gun ship was launched in 1848, but she also seems to have been soon broken up as unseaworthy. It is to be hoped the new ship will be more successful. ("Mittheilungen nach Nowoje Wremja.")

The armour and projectile trials were renewed on October 4 at Ochta, near St. Petersburg. Two 6-in. Harveyed plates, by Messrs. John Brown and Co. and Messrs. Vickers respectively, were attacked, says the "Times" correspondent, by the 45-calibre 16-in. Oboukhoff guns. The conditions, so far, seem to have been much the same as in July last, when plates by Messrs. Brown and Co. and Messrs. Cammell, of Sheffield, were under trial, and the result appears to leave Messrs. Cammell still to the front with their Harveyed plates. Messrs. John Brown's plate on this occasion was 6 ft. square, and had one corner and a strip all round left unhardened, in order to prove that the Harvey process can be so applied to armour plates as to leave softer spaces for the drilling of holes after the fixing of the armour to the sides of the ship, and this without affecting the quality of the plates. Messrs. Vickers' plate was 8 ft. square. Two rounds were fired at each plate in the normal position with a striking velocity of 1,889 ft., the first with ordinary Holtzer shells and the second with Holtzer shells improved by the "magnetic" process of Admiral Makaroff. Both varieties of shell were manufactured at the Putilof works. Every shot passed through the plates. Messrs. Brown's plate cracked considerably at the first round, but the second shot produced no cracks. The first shell fired at Messrs. Vickers' plate passed through both plate and backing; the other was broken up in or behind the backing. Messrs. Vickers' plate was next placed at an angle of 15°, and with the same velocity one round was fired at it with the "magnetic" shell, which broke up in the backing, perforating and cracking the plate severely. The experiments are to be continued, so that judgment upon them must be suspended.

Sweden.—The naval manœuvres this year, in which most of the vessels of the Swedish Navy took part, had for their object to determine the important question among others as to the sufficiency of the fortifications of Vaxholm.

These works, constructed on the Island of Vaxoë, to the south of the capital, are intended to serve as the base for the fleet in the event of war. The question has arisen as to how far they are in a condition to serve for that purpose. The fleet was divided into two squadrons, one for the attack and the other for defence. The coast line to be guarded extended from Landshort to Sandhamm, and the defending force occupied a line from Arkö to Oxelösund, while the object of the enemy was to land a force sufficiently strong to seize Stockholm. Full details of the operations have not been published, but it is believed that the result will be a demand on Parliament for a special credit to extend the defensive works.

The Government intends to establish high watch-towers along the Baltic coast on suitable islands, which will be in telegraphic and telephonic communication with the mainland, and from which all movements of hostile vessels can be immediately seen and reported. Prince Oscar, in command of the gunboat "Svenskund," has been employed in selecting suitable positions for the contemplated look-out stations.

("Die Reichswehr.")

A new 4¾-in. naval Q.F. gun of 44 calibres length, with screened carriage, has been lately tried. The bore has 36 1½-in. grooves, with a twist progressing from 3° to 6°. The barrel alone weighs 61 cwt., and the total weight of the gun with carriage is 131¾ cwt. The gun is "built up" with an outer tube, without trunnions; these being affixed instead to the "recoil casing," fitted with hydraulic brake, and and in which the barrel is movably inserted. The breech has a screw fermeture, with ogival screw, and contains remarkably few parts, viz., 14. It has a safety arrangement which prevents firing the gun unless the breech is completely closed. The importance of this precaution has been demonstrated by a recent accident in France, due to an imperfectly closed breech, and which was alluded to in these columns. There is also a special protection against accidents from charges hanging fire. The gun can be fired either by a trigger or by electricity. The carriage permits elevations between +15° and −7°. Four men are required to serve the gun, viz., one to manipulate the breech, another to remove the exploded cartridge, a third to insert a new one, and a fourth to lay and fire the gun. The gun will fire ordinary howitzer or armour-piercing shells, shrapnels, or case-shot, all 44 lbs. in weight. With 15½ lbs. black powder the initial velocity attained was 2,019 ft., while the gas pressure was as high as 36,985 lbs. per square inch. But materially higher ballistic performances, with lower pressures, were obtained with smokeless (Nobel's) powder. With 8¾ lbs. an initial velocity of 2,425 ft., with 32,720 lbs. pressure, was obtained; with 7¾ lbs., 2,392 ft., with 32,500 lbs. pressure; and with 10¼ lbs., 2,727 ft., with 33,677 lbs. pressure. The speed of firing attained, with rather unpractised men, was about five seconds per round.

("Militär Wochenblatt.")

United States.—The following information relative to machine-gun trials will be found of interest:—

Upon the recommendation of Commodore Sampson, Chief of the Bureau of Ordnance, United States Navy Department, the Secretary of the Navy has authorized the invitation of the Gatling gun and the Maxim-Nordenfelt companies to manufacture respectively one gun each of calibre 6-mm. to be tested in comparison. As the character of the ammunition influences in a very important way the efficiency of a gun, in order to enable the Board to reach a conclusion which gun is best for the navy, it is thought advisable to compare these guns with the ammunition they will use in service. The Driggs-Schroeder firm, who are agents for the Accles gun, have requested permission to make an improved gun of 6-mm. calibre and present it for trial.

The Bureau has recommended that all competitors in the late trial be allowed to present guns of 6-mm. calibre if they desire. In every case the ammunition to be used will be furnished by the Government. The object of this is that all shall use absolutely the same kind of ammunition. It is expected that several months will be required to prepare for this test.

The following is a synopsis of the majority and minority reports on the trial of machine-guns, under order July 5, 1894, begun July 6, and continued till August 4, 1894:—

The majority report is signed by Philip R. Alger, professor U.S.N., and A. C. Diffenback, ensign U.S.N.

Six guns were submitted, viz., Gatling, Accles, Gardner, Robertson, actuated by hand cranks and of multi-barrel system; Maxim-Nordenfelt and Skoda, automatic and single-barrelled.

The Robertson gun was withdrawn permanently during the progress of test, and the Gatling and Accles were both temporarily withdrawn. The tests were made at the Washington Navy Yard and Naval Proving Ground.

The range was 25 yds. at the Navy Yard, the merit of each gun considered under the following heads:—1. Certainty of fire, ammunition supposed to be efficient. 2. Simplicity of mechanism and its liability to get out of order in service. 3. Accuracy and facility of aimed fire. 4. Rate of fire. 5. Weight of gun. 6. Method of feed and ammunition supply. 7. Ease and convenience of manipulation. 8. Crew required.

Relative value of the above features, the final order of merit, is submitted as follows:—

Maxim-Nordenfelt (Maxim is an American inventor), Gatling, Accles, Skoda, Robertson, Gardner.

Taking up the guns in the inverse order of merit as above determined, the advantages and disadvantages of the various systems are as follows:—

Gardner.—Disadvantages: 1. Low speed of fire in proportion to weight. 2. Great derangement of aim by the effort on the crank and its location. 3. Liability to damage through hang fires. 4. Gravity feed and frequent jams of feed. 5. Insufficient power of extraction and play of extractor, permitting slipping off rim of cartridge, causing failure to extract and loss of several unfired cartridges each time the gun is cleared. 6. Intermittent fire. 7. Unserviceable character of charger, due to instability and liability to damage from weather and transportation. 8. Number of men required in crew.

Advantages: 1. Simplicity of mechanism. 2. Comparatively light weight.

Robertson.—Disadvantages: 1. Insufficient support of cartridge at the chamber, due to the design of feed wheel and belt, causing ruptured cases and jams. 2. Derangement of arm by crank effort. 3. Liability of feed belt to jam through bending or displacement of links. 4. Lack of facility of slowage of ammunition, due to design of feed belt. 5. Liability to damage by hang fires.

Advantages: 1. Lightness and consequent mobility. 2. Shock of recoil not communicated to mechanism, but taken on frame. 3. Simplicity of mechanism.

Skoda (Austrian).—Disadvantages: 1. Gravity feed and consequent interruptions, jams, and liability to premature explosions. 2. Failure to work automatically unless the cartridges and chamber are lubricated. 3. Complexity of mechanism. 4. Small range of working limits with diminished pressures, due to deteriorated ammunition. 5. Slight derangement of aim due to pressure required to overcome spring on charger in feeding. 6. Weight and cumbersome character of chargers. 7. Liability to temporary inaction from damage to single barrel. 8. Impracticable cooling device for barrel.

Advantages: 1. Lightness and consequent mobility. 2. Freedom from damage due to hang fires. 3. Great directive facility, due to absence of disturbing influence of crank effort. 4. Two men only required in crew.

Accles.—Disadvantages: 1. Great weight, making the gun inconvenient for boat or landing purposes. 2. Derangement of aim by pressure required on charger to overcome spring of lever which throws feed mechanism in action. 3. Liability to hang fires. 4. Very small actual volume of fire in proportion to number of barrels and weight, due to gearing down of crank at trunnions, crank effort, and intermittent character of fire. 5. Complicated, heavy, and cumbersome feed mechanism, and its liability to jam by loose cartridges, and also the time, effort, and skill required to clean. 6. Unsuitability for service use of chargers for the reason that if the charger becomes bent or wet its rigidity is destroyed, and the cartridges lost through inability to use in the guns. 7. Intermittent fire and large intervals between the fire of chargers. 8. Number of men required in the crew.

Advantages: 1. Capability of use with any number of barrels less than the full number, in case of damage to barrel or lock, but with the probability of a jam if fired at depression under these circumstances. 2. Adaptability to motor power. 3. Familiarity of the service with this type of mechanism.

Gatling.—Disadvantages: 1. Great weight, making the gun inconvenient for boat or landing purposes. 2. Great derangement of aim by the effort on the crank and the location of the latter. 3. Liability to damage by hang fires. 4. Small actual volume of fire in proportion to number of barrels and weight, due to crank effort and intermittent character of fire. 5. Liability of cartridges in feed strip

being displaced, causing a jam. 6. Intermittent fire. 7. Number of men required in crew.

Advantages: 1. Simplicity of charger and hopper, making the clearing of jams easy and rapid. 2. Capability of use with any number of barrels less than the full number in case of disabling lock or barrel, but with a probability of jam if fired with depression under these circumstances. 3. Familiarity of the service with this type of mechanism. 4. Adaptability of motor power.

Maxim.—Disadvantages: 1. Complexity of mechanism. 2. Liability to temporary inaction, due to damage to single barrel. 3. Necessity of renewal of water supply in jacket after continuous firing of about 2,000 rounds, and from leakage.

Advantages: 1. Lightness and consequent mobility. 2. Freedom from damage due to hang fires. 3. Great directive faculty, due to absence of crank effort. 4. Small crew required. 5. Continuity of fire. 6. Facility of packing and stability of cartridges, due to design of feed belt.

The majority concludes that the efficiency of an automatic machine-gun is so much greater than a gun worked by hand, that nothing but a strong presumption that they will not remain efficient in actual service can justify the adoption of the inferior but less complicated gun. Regard was given to the greater skill required to operate the mechanism of an automatic gun. The Board concludes that too much would be sacrificed to fear of lack of skill if the great advantages of the automatic system were put aside.

"That the Maxim-Nordenfelt proved itself greatly superior to all others submitted, the only hitches in the trial being attributed to defects in ammunition. These are found in all guns, and are remediable." This gun has seen actual service since 1888, and was officially adopted in the German Navy. The Board determined to recommend the consideration of two systems, one for use on shipboard and one for landing purposes.

The increase in volume of fire of the Gatling and Accles guns over the Maxim-Nordenfelt proved so slight that the simplicity due to the use as a single barrel outweighed that slight advantage.

"The Board, therefore, recommends the adoption of the Maxim-Nordenfelt gun, and that all machine-guns for the naval service be of this type contingent upon the successful test of a gun of 6-mm. calibre."

The Minority Report.—The minority report of the trial of machine-guns, signed by C. S. Sperry, commander U.S.N., senior member, dissents from the recommendation of the Maxim-Nordenfelt. It states the technical difference between guns of first class requiring hand or motor power for loading, firing, and extracting, and the second class or automatic guns utilizing force generated by the explosion of the charge to continue the operations of loading, firing, and extracting after the first round has been fired by hand. The report agrees with the Board in placing the Gatling first among guns of its class. With this gun in the beginning the tin charger strips were defective, causing jams. They were remedied. The firing of the Maxim was frequently interrupted by the transverse rupture of the cartridge shell. In the final test, the minority declares, with an inexperienced crew, 1,200 rounds were fired; one belt of 250 was fired without interruption; one belt with only one interruption, and of the remaining 700, 30 per cent. failed. The report adds: "If the peculiarities of a gun are such as to require a perfection of ammunition, it is not serviceable, and its failure cannot be ascribed to defective ammunition. Four years have shown that this defect is not unprecedented in this gun." An officer witnessing the trial of a gun manufactured for the German Government reports that it stuck badly.

Test No. 9 shows as follows:—

Targets 12 ft. high, 30 ft. long.

Gun.	Rounds fired in four minutes.	Hits.			Percentage of hits.
		500 yards.	1,000 yards.	Total.	
Gatling.....	1,547	305	207	512	33
Accles.....	795	215	149	364	46
Gardner....	538	104	52	156	29
Maxim	720	275	124	399	55
Skoda	875	207	234	441	50

The Skoda gun was fired for 2 mins. and 45 secs. only, the ammunition supply giving out. The Gatling was fired without interruption, and the Maxim had five interruptions in the first two minutes. The Gatling scored 512 hits, and Maxim 399, but it is not to be supposed that the 1,035 rounds from the Gatling, and 321 rounds from the Maxim, which did not score, would have been entirely wasted in firing at as large a target as a ship. The minority report states that obviously the advantage is with the gun which fired the greater number of rounds. If a gun will not deliver its fire when called upon, the most phenomenal efficiency at some later but uncertain moment cannot redeem the situation. The minority concludes: "The Gatling gun has been in use in the naval service for many years, and I have the honour to recommend that it be retained as the gun likely to prove serviceable."

MILITARY.

Home.—*The Death of Mr. James Anthony Froude.*—It is with the deepest regret we record the death of Mr. J. A. Froude. To his rare literary talent the Press has already paid its tribute, but it has not done, because it cannot do, full justice to his claims for honoured remembrance from all ranks of the British services. These can only be appreciated by those whose training enables them to fill in between the lines of his works the pulse and passion of war, and the nature of the men and the elements by which war is controlled and has its being.

We deeply deplore our literary incapacity to do justice to this theme, and can only plead in extenuation that we feel that it would be a dereliction of duty on our part to let this event pass without some words in recognition of the debt the fighting services owe to him.

Let us recall for a moment the attitude of men's minds at the period he began to write towards those who wore the uniform we all honour. The Manchester School and little England party were then in almost unchallenged ascendency, and to the historians then most studied, war was not only a crime but a blunder, being an anachronism; Statesmen were rogues when they were not fools, Generals were impostors when they were not scoundrels, and the rank and file were brutal and licentious hirelings, whose courage might be bought for a shilling a day in any quantity required. A few lines from the pen of a friend may make the situation clearer. "I was brought up," he writes, "in Germany in a district and amongst men to whom the War of Liberation and the sacrifices it involved were a very real and vivid recollection; traces of the ruin and devastation it occasioned were visible in every direction, hardly a hamlet or a village for miles round but had given its name to some battle or skirmish, well known in the history of that epoch. Amidst these surroundings we learnt only of honour and duty, how thoroughly, well the graves round Metz, Paris, and Belfort, abundantly testify. Returning to England to a great public school, I shall never forget the repulsion

with which the conventional attitude of mind towards the services filled me. The army was a profession like any other; you entered it for pay, or because the uniform was striking, and you could command family interest—never for duty, and the history we learnt taught us only that our forefathers had been either knaves or fools, or both combined. And yet our roll-call reminded us daily of the fact that it was our fathers and grandfathers before us who stormed the breaches of Badajos and fell at Waterloo; but nothing was done by our pastors and masters to bring home to us the teaching of their lives. The Great Duke's bust looked down upon us from the centre of the quadrangle, our dormitories bore the names of his most trusted leaders, but never a word was told us of the true significance of their lives, and only the other day I was astonished to find that an old schoolfellow was unaware of the fact that Anglesey and Combermere were perhaps the greatest cavalry leaders the Napoleonic epoch produced. We learnt our history from Macaulay and Hume, modified by Hallam, and the impression left on us was dreary in the extreme. Then came Froude's history upon us like a revelation—like the burst of the monsoon after three years' drought; what that means only one writer has ever told us; his name, I believe, is forgotten, but his work still lives in the pages of the 'Prem Sagar,' and the day on which, after reading uninterruptedly for 14 hours, I laid down the twelfth volume my life resolution was taken, and by the help of God it shall be adhered to to the end."

Out, far away, by camp fires in the hills and on the plains, in circumstances where men speak the whole truth that is in them and nothing else, in substance and effect the same tale has been told to us, and what we now write, however imperfectly expressed, we know will find an echo in thousands of other men's hearts.

Honour, truth, and disciplined self-sacrifice are the key-notes of Froude's work, and who is there who, knowing the unwritten history of our services during the past 30 years, but will recognise that our gains might have been far greater, and the expenditure of life far less, had these factors, and these only, animated all men and officers instead of only a fraction of them? Our greatest men owe all their glory to them; but how much greater might it not have been if those around them had possessed the same faith in the same degree?

We do not mean to imply that our leaders were deficient in these attributes; the navy never has been, for they at least escaped the blighting influence of a public school education, and the record of the Mutiny alone suffices to dispel this charge as regards the army. The point is this, that those leaders for the most part entered the service at a time when the war tradition of the race was as yet unbroken, and flourishing in full vitality, kept alive by the splendid *esprit de corps*, the special attribute of long service conditions, which made the regiments a school of character for all who survived the training, men and officers mutually reacting on one another. But when the changes of 1871–72 overtook us, the war tradition was waning, young officers were, and had been for some time, joining without that training in high ideals that Froude's work so admirably supplies, and at the same time the *esprit de corps*, which might in part have supplied its place, had been shaken to its foundations. Even this is not all. Education and short service combined were bringing into the ranks a totally different set of men, requiring a corresponding change in the method of maintaining discipline, and bringing us face to face with the same problem the Germans were confronted with in 1807. With us now, as with them then, an officer can no longer rely on punishment only to maintain discipline—sheer strength of character will alone suffice; this force springs mainly from the study of high ideals, and in so far as Froude has supplied us with these ideals to a greater extent than any other civilian author with whose works we are acquainted, we hold that he deserves a special place in the hearts and minds of all who wear the Queen's uniform.

Cylindrical Navigable Balloons (reprinted by permission from the "Royal Engineers Journal.")—I have been asked to write a short account of the cylindrical, gas-tight, navigable balloon I recently patented (No. 10,610 ^{04})—such an account as might possibly interest the general reader. I have much pleasure in making the attempt, for the more the important subject of ballooning

is ventilated the sooner will scientists give it consideration, and the world obtain an engine which would be of incalculable advantage to all mankind.

The volume of gas necessary to float the weight of efficient, far-travelling balloons, with their indispensable accompaniments, can only be carried by those of a cylindrical shape. The vertical diameter, of salmon or spindle forms, of sufficient capacity would be far too great to be manageable. Even in the cylindrical there is a limit to the diameter, but none to its length, provided all waving in flight be prevented.

A tube, say a foot in diameter, of tough aluminium alloy the length of the balloon, virtually a backbone, gives the required firmness. It is retained in position by shafts rising from several cars suspended from the balloon. Between these cars are the axles on which the propelling screws revolve.

However large the balloon, there is a limit to the diameter of these screws, for weakness attends length; therefore many screws become necessary, and there is ample space for them in the proposed cylindrical without the useful action of any being interfered with by its neighbour; but, given a named capacity, the greater the length of the balloon the greater the difficulty in steering it. This is effected by attaching the leading screw to a horizontal frame (a table) fixed at the bow of the leading car, and giving the æronauts the power of turning the table to any part of a half-circle. The necessary flexibility to the rotating driving shaft is given by forming in short conical links the portion of it which lies on the table. A ring on the small end of one link is loosely grasped by the large end of the adjoining link. Circular cogs inside one link, and rectangular on the other, preserve continuity in rotation, while admitting slight extension or contraction in the length of the shaft as the links vibrate in rotating.

The skin is kept extended by making automatic the necessary pressure on the gas within it. Immediately above the described backbone (of the calculated diameter necessary for its acting as a condenser) there lies horizontally a light basketwork frame, the length of the backbone, and of the width most suitable for spiral springs of many coils, at the bottom of the named shafts, to so push the frame horizontally upwards that the skin resting on it shall be pressed against the confined gas with the strength necessary to keep the skin extended, yet to allow its yielding on any expansion of the gas. Or the necessary pressure could be obtained by utilising the weight of parts of the steam-engine and propelling apparatus not necessarily fixtures to cars. A cord from the bottom of the shafts which support the tubular backbone would pass over a pulley fixed to a transverse bar resting on the sides of the car, the designated weights being attached to the other end of the cord.

Apart from questions about propulsion, the construction is most simple—a great contrast to the æroplane system. However long the cylindrical balloon, it is merely a succession of similar rectangular sections joined together on the ground, and inflated, after being laced to the tubular backbone through small loops at its bottom. No further experimental trials would be required than could be effected with one vertical section of the balloon while being built, to determine the size of the square meshes which should encircle it—the breadth of the aforesaid basketwork—and the amount of upward pressure necessary to keep the skin constantly extended, however sudden any change in the bulk of the confined gas. Without change in its cylindrical form, the balloon could at any time be easily altered in size by increasing or diminishing its length.

It is undeniable that immense balloons, capable of carrying immense weight, have been floated, at a time, too, when no skin was procurable nearly as efficient and light as can now be manufactured. The balloon built by that glorious engineer, Henri Giffard, who had the envied honour of being the first to steer a Navigable, was witnessed by thousands at Chelsea, and at the Paris Exhibition, in 1878. It was nearly 883,000 cubic feet capacity, with accommodation, it was said, for 52 persons, and supported a cable of sufficient strength—therefore of great weight—to enable it to ride safely through a very severe storm, notwithstanding the resistance to the wind presented by its wide pear-shape. In order not to chafe the skin, instead of the usual rope, the net is formed of thin waterproof webbing.

The square meshes, of an unvarying size, are the greatest that the strength of the skin enclosed within them will with safety permit.

A sharp-pointed aluminium cone, firmly attached to the leading end of the tubular backbone, almost unresistingly pierces the air and effectually prevents all caving in of the skin. With this sharp entrance and many propelling screws, quick voyages could be made, for, without in the least changing the horizontality of the balloon, by very slightly inclining the rudders, horizontally hung on both sides of the car, the æronauts could steer to a higher or lower elevation when seeking a more favourable current of air. The greater their speed, the less the inclination. How curiously little it need be is shown by the fact that in free balloons the release of a carrier pigeon causes a slight rise. Mr. Redfield, many years ago, wrote that few of the progressive revolving storms—described by Sir William Reid as from 500 to 1,000 miles in diameter—exceed a mile in height. In the fiercest storm the balloon is as undisturbed as the fly buzzing about in a railway compartment, whether the latter be running at full speed or suddenly halted. The propelling screws being at rest, the balloon in the fiercest storm is an unagitated atom, floating tranquilly in the large volume of driven air, which the æronauts will not quit as long as it accelerates their progress; the smoke from their cigars will curl as gracefully upwards as if enjoyed in their quiet homes.

In balloons of different sizes, but of similar forms, their floatages (the gas) being as the cube, while their surfaces are as the square, there really is but little limit to the weight that could be carried. The larger a balloon, the less the proportion of floatage required to carry the propelling power. Let one balloon have twice the diameter of another of similar form, the surfaces opposed to progress in the greater will be as four to one (demanding a propeller four times more powerful), while the floatage will be as eight to one. It is, therefore, clear that in large, far-travelling balloons the weight of the extra skin within the extended cylindrical skin is of little moment. Though the greater the tonnage the less the price per ton, doubtless a thoroughly efficient Navigable would be costly to any individual, but such balloons, say half the capacity of Giffard's, would prove an incalculable saving to civilized nations. Expenditure on armaments would be folly when the very best could be destroyed by chemicals of indescribable power, dropped with impunity by a foe visible at an unapproachable height, or invisible on dark nights, yet seeing all with the aid of his search light. As wars would lead to annihilation, not acquisition, the whole civilized world would be blessed with peace, the diabolical slave-raiding encampments be dispersed, half-civilized nations be controlled without bloodshed, parts of many hundred miles of railway on barren lands be torn up, when judged necessary, and thus be deprived of strategic value; but, unfortunately, a light motor is wanted. As yet, in the well-meant effort to spare the national purse, though at no time was the defence of our immediate and colonial shores of such vital importance, no steps have been taken to compete with other nations in the struggle to obtain engines of war destined to make vast, though economical, changes. No sum should be regarded as extravagant to acquire efficient, safe propelling power of little weight; and surely in every country men who reflect, taxpayers especially, would act wisely in urging their respective Governments to offer such rewards as would induce the cleverest engineers to exert their brains to meet the difficulty.

Mr. O. Chanute, the well-known consulting engineer, who was chairman of the committee of engineers assembled at Chicago, in August, 1893, to report on "Ærial Navigation," approves of my design. I explained it to him before forwarding my complete specification to the Patent Office, but he says that success cannot be obtained without a suitable motor. On the 10th of last June he wrote:—"Once you have such a motor, say 8 to 10 lbs. per horse-power, and safe against explosions, the rest will come easy, and your efforts will be recognised." I wrote to the Hon. Charles A. Parsons, whose compact, light, high-pressure steam-engine, revolving nearly 12,000 times a minute, attracted great attention and praise at the Inventories, in 1884. In his reply of the 17th ultimo, I had the gratification of reading:—"I have by me a small steam-engine and boiler, weighing 1¼ lbs. complete, which is capable of exerting ⅛ horse-power." As this means 7½ lbs. for 1 horse-power, unless Mr. Chanute is too sanguine, it is reasonable to believe that,

through Mr. Parsons' unusual mechanical talent, we are on the eve of a perfect revolution in matters of the utmost national importance, and at a time when the whole world is in a peculiarly unsettled state.

W. N. HUTCHINSON, *General.*

October 9th, 1894.

Small-calibre Rifles.—The re-armament of the infantry with the new small-bore rifle goes on apace in the armies of the various military Powers. The following details have been extracted from the latest reports obtainable on the subject:—

France was the first, in 1886, to adopt a rifle of small calibre and flat trajectory, and her example has been generally followed. The bulk of her troops are now armed with the Lebel 8-mm. rifle, model 1886, modified in 1893, initial velocity 630 m., weight of bullet 15 gr.

Russia, in the course of the current year, will complete the arming of her troops of the first line with the Mossine rifle, model 1891; the calibre is 7·62 mm., initial velocity 610 to 620 m., weight of bullet 13·86 gr. The Berdan rifle, No. 2, is to be altered to fire a bullet of small calibre.

Italy: 170,000 rifles of the 1891 model (Parravicino-Carcano) were to have been ready by the 1st July this year. The weapon has a calibre of 6·5 mm., initial velocity 710 m., weight of bullet 10·5 gr. The Minister of War has had a sufficient sum placed at his disposal to enable him to provide the material necessary for several thousands more of the new arm; 50,000 have been issued to the Alpine Chasseurs, 100,000 to the infantry in North Italy, while the number of arms turned out in a month is about 11,000.

Belgium has adopted the Mauser rifle, model 1889, calibre 7·65 mm., initial velocity 600 m., weight of bullet 14·1 gr. Date of completion of re-armament uncertain.

Austria-Hungary has adopted the Mannlicher, 1890 pattern, with a calibre of 8 mm., initial velocity 620 m., weight of bullet 15·8 gr. Experiments have also lately been carried out at Vienna and Steyr with a new rifle of 5 mm. calibre. Excellent results are said to have been attained, but no report has yet been published.

Turkey: The army is still practically armed with the old Henry-Martini, but 250,000 of the 9·5-mm. Mauser were delivered in 1892, and more than half a million of the 9·5-mm. and 7·65-mm. rifles of the above type were delivered in April, 1894, but not a single one has yet, according to the latest accounts, been issued to the troops (for details of Mauser, see Belgium).

Spain: The 7-mm. rifle first adopted has been modified, and is now known as the Spanish Modified Mauser Type 1893. Calibre 7 mm., initial velocity 728 m., weight of bullet 11·6 gr. Of these rifles, 100,000 have been purchased recently in Germany, and the manufacture is also being carried on at the factory at Oviedo; in addition, trials have been made at Oberndorf with a view of replacing the Freyre-Orban cartridge, model 1889, by cartridges with smokeless powder for the Remington rifle, of which a large number are still in use.

Sweden and Norway: Both countries have adopted a 6·5 mm. calibre weapon. Sweden has chosen the Mannlicher of the latest type; initial velocity 623 m., weight of bullet 14·5 gr.; while Norway has preferred the Krag-Jörgensen, whose mechanism is very similar to the Remington: the initial velocity is 700 m., and weight of bullet 10·1 gr. The provision of the new rifles has, however, been spread over a great many years; the non-commissioned officers of infantry will be armed with sword and revolver instead of with rifles.

Roumania: The manufacture of the modified 1893 6·5 mm. calibre Mannlicher rifle has been completed, and the weapons were delivered at the end of last April. The initial velocity is 740 m., and weight of bullet 11·25 gr. The necessary steps are being taken to provide machinery for the manufacture of cartridges in the country.

Bulgaria: The troops are actually in possession of 140,000 Mannlicher rifles, model 1888; calibre 8 mm., initial velocity 620 m., and weight of bullet 15·8 gr.

United States has adopted the Krag-Jörgensen with a 7·62 mm. calibre, initial

velocity 732 m., and weight of bullet 14·2 gr. It is expected that the necessary supply for the troops will be completed by the end of this year.

Germany is still carrying out experiments with a rifle having a 7·9 mm. calibre, initial velocity 620 m., and weight of bullet 14·5—14·7 gr.

England: The Lee-Metford has a 7·7 mm. calibre, with initial velocity 670 m. (cordite cartridge), weight of bullet 14 gr.

Austria-Hungary.—The experiments with cycles in the recent manœuvres are considered to have been very satisfactory. The ground, it is stated, was unfavourable, being hilly, clayey, and sodden with rain, which may account for the exceedingly indifferent times quoted as satisfactory examples, viz., 7·5 miles over undulating ground in 36 mins., and 37 miles in four hours, barely up to the form of a 13·3 C. B. from Kalka to Umballa.

Belgium.—Following on the lines laid down in the German Army, viz., substitution of aluminium for iron or steel wherever practicable, and the diminution of the number of rounds carried from 180 to 120, the Belgians have succeeded in reducing the weight carried by their infantry from 28·850 kilos. to 24·600, in all a reduction of 8½ lbs. The weight still carried, viz., 53 lbs., seems excessive.

The experimental mobilization of the 4th Division of the Belgian Army is reported by the "Avenir Militaire" to have been a complete success. Men, horses, and transport were collected without friction, and directed by road to the camp of exercise at Beverloo, where they soon settled down to their work and gave every satisfaction.

France.—*The Siege of Paris*, 1894 (collated from "Le Figaro" of September 15, 1894, by permission from the "Royal Engineers Journal").—Paris has been besieged for 10 days, but the siege does not resemble those that have preceded it, for the operations are directed by General Saussier, and, if it is General Coste who is in charge of the defence, it is also a French general, Giovanelli, who is besieging the place. As in the autumn manœuvres, no ball ammunition is used; but in this siege the work is more real, as it is easier to represent a siege than a battle. Manœuvres are necessarily somewhat unreal; in actual war it is not enough to *design a turning movement to assure its success, but it is also necessary* to allow for the determination of brave men, the impetuosity of well-trained troops, the weakness of character and mistakes of certain senior officers, and even the element of luck; yet, however well manœuvres are arranged, it is impossible to take into consideration these very important factors. Umpires gallop about, and argue at length, but their decision pleases no one.

A siege, however, can be carried out more by rule of thumb.

The questions to be solved in this siege were—how to attack, and how to defend? *Since 1871 the artillery has increased its powers of demolition*, and the engineers their powers of resistance.

Everyone knows that the formation of a breach is a difficult matter. If the *fire be hurried, the first blocks of masonry which fall form an obstacle*, and arrest the fall of the matter behind; the face of the earthen slope slips, but only to make another slope often impassable.

Now, however, the artillery, by careful salvos, cuts out a portion of the escarp until the whole falls together, leaving the required passage. These methods of fire *have been tried and perfected* until it only remained to experiment with the strategy of a future siege and the modern tactics of the besieged.

From the top of the Eiffel tower, with a good glass, the new forts which guard *Paris can be well seen.*

On account of the development of its suburbs and suburban localities, Paris need not fear being captured by assault. Famine and bombardment are the methods of attack to be met, and the engineer officers have endeavoured to provide against these for both the civil population as well as the defensive troops.

The outlying forts, doubtless, do not always actually cover the ground between

them, but the unprotected spaces are filled in time of war with batteries, redoubts, and infantry entrenchments covered with the usual obstacles.

With the complementary works, the defensive line of Paris describes, around the city, a series of arcs of a circle which passes by Marly, Saint Cyr, Palaiseau, Villeneuve-Saint-Georges, Champigny, Chelles, Ecouen, Domont, and Cormeilles. Consequently the besieger, who has naturally to instal himself at some distance from the forts, and to choose his cantonments beyond the range of the large guns of the defence, will have his outpost line running through Pontoise, Luzarches, Claye, Lagny, Brie-Comte-Robert, Corbeil, Arpajon, Chevreuse, Neauphle, and Melan. It is also probable that the Governor of Paris would strongly occupy the heights of L'Hauthie, which command the confluent of the Oise and the Seine, and which the engineers in 1872 obstinately refused to fortify.

Suppose Paris invested, then enclosed by her perimeter of over 64 miles, there would be more than three million people, and more than two million soldiers. Every man under 45 years of age within the defended area would have to wear a uniform, while the remaining men would be made use of in different indispensable public services.

Paris would be simply a camp, and a camp unlike that of 1870, in which there was no real discipline or order. It will be a camp in which all want of discipline will be pitilessly repressed, and in which the Governor is the sole master of life and of the liberty of all.

Since 1870 the whole of the French military organization has been remodelled completely. The method of recruiting has been entirely changed, the number of regiments has been almost doubled, and the matériel has undergone still more radical and rapid transformations. Progress in artillery projectiles and the introduction of smokeless powder have caused great changes in the tactical rules for the different arms. The French artillery in 1870 only possessed 984 guns; nowadays it has 2,780. The official regulations define and state the duty of siege artillery in the following words: "To fight and reduce to silence the powerful artillery of the besieged place, which generally possesses some guns of the largest calibre; to render uninhabitable the *terrepleins* of the fortification; to break down the shelters that have been established; to destroy all the defences of the place; to open, from a distance, if that is possible, the ramparts to the besieging army, by destroying the escarps of the fortifications, and overthrowing the parapets into the ditch, so as to form practicable ramps for the columns of assault."

In time of peace there is no regularly organized siege park in France, but after the first victories on the frontier the necessary elements would be collected from the entrenched camps of Paris, Lille, Epinal, and Verdun, and sent forward. The park thus formed for the siege of a first-class fortress would comprise:—

	Inches.
15 rifled mortars	10·6
15 "	8·6
20 B.L. (long)	6·1
20 B.L. (short)	6·1
15 B.L.	4·8
20 B.L.	3·8
10 mortars	5·9

It is no small matter to transport these heavy pieces, besides the larger quantities of shells and cartridges they consume, and all the indispensable accessory material required for the construction of siege batteries. In this respect the besieged will have an advantage over the besiegers. Without entering too much into technicalities, it may be noted that the 8·6-in. mortar weighs over 2 tons, and, with a charge of 14 lbs., has a projectile of about 220 lbs. The allowance of ammunition for such a gun for a siege of a month is 100 rounds a day, or 3,000 a month. When it is thus seen that, for this gun alone, 295 tons of projectiles are required in a month, it will be realized what the difficulties of transport will be, and, the transport being given, what a shell trap an attacked isolated or detached fort must become. But the capture of these "shell traps" will be very costly to the besieger, both as regards money, men, and personal efforts.

Formerly an investing army constructed round the besieged place an annular position, which was a kind of corridor bounded by two continuous lines of works, between which the troops were installed. The outer line of works facing away from the attacked place were called lines of circumvallation, and the inner line of works facing towards the attacked place were called lines of contravallation. The former were to resist the efforts of a relieving force, the latter to resist the sorties of the besieged. It is hard to realize in these days of railways, telephones, rapid-firing guns, and melinite shells that such methods took place not so very long ago. Had the Germans in 1870 constructed lines of circumvallation round Paris they would have been nearly 44 miles in extent. Yet France's only thought at that time was to deliver Paris. The capital was the objective of Generals Chanzy and Faidherbe, and when General Bourbaki undertook his diversion in the east he hoped to take in reverse the lines of the besiegers. But the German staff, instead of weakening their troops by imposing on them the construction of field works on an extensive scale, detached from the investing army before Paris certain corps which reinforced opportunely the German armies operating in the north, on the Loire, or on the Vosges. The same principle will hold in the attack of entrenched camps. The opening stages of a siege are described by the following words of General Delambre:—"Large fortresses provided with detached forts, holding large garrisons, have an extended perimeter, and, therefore, in order to be able to resist successfully all the efforts of the besieged without keeping a large army immobilized on the spot, it will be necessary to make the access to the positions occupied (by the besiegers) very difficult, and consequently to prepare not lines, but positions more or less continuous, and connected together, to which all the resources of field fortifications are applied."

We can now describe the phases of a future siege. Forewarned some time in advance that the invading army is marching on the capital, the governor will have taken all the customary precautions. He would first arm the forts and put them in an efficient state for defence. In most of the Paris forts the faces most menaced are protected either by armoured batteries, or by cupolas, or by invisible batteries that can only make use of indirect fire.

It is necessary also to consider the question of food in a fortress, for the governor, even if he has recourse to barbarous measures, will never succeed in ridding himself altogether of the useless population.

The experience of 1870 has shown this question of food to be one of the first importance. To avoid epidemics, the ordinary food of the army and populace must be changed as little as possible. The military magazines of food are always kept filled, and the factories and private stores of tinned and other foods would be at once requisitioned on. These tinned foods are thought highly of, as they economize space so greatly, and in the case of soups and vegetables only require boiling water to prepare them for consumption. Of dried vegetables, 40,000 rations occupy only a space of 1·3 cubic yards. Pasteurized milk will also be largely used, and was issued with good results to the troops in Tonkin and Dahomey. During the tragical days of the siege of Paris the very old and the very young suffered a terrible mortality. Milk was, in fact, unobtainable, except at the price of gold, and then it was small in quantity and poor in quality. This want of milk was a great privation to the sick, as well as to the old and young, but fortunately science has found a simple method of preserving milk, which at the same time makes it pure and frees it from decomposing ferments.

From what has been said it will be readily seen that the duties of the governor of a fortified place are multifarious and almost unlimited. He has all the cares of a manager as well as the great responsibility of a general. It is he who is the soul of the defence; if he is weak and undecided in character, the defence will neither be obstinate nor energetic.

The tenacity of the defence will largely depend on the tenacity of his character. He may be pictured, when at his post, as being in telephonic communication with all his forts and batteries and other works. A large-scale map of the place and its environs before him gives him the exact position of every gun and the different ranges so accurately that he can, by telephone, direct the fire of the necessary guns on to any required point.

As no single man, whatever may be his courage and zeal, is capable of performing all these multifarious duties, the governor is provided with a carefully-selected staff composed of the senior artillery and engineer officers, a chief of staff, and seven or eight officers of the active and territorial forces. Each of these officers has his well-defined duties.

Early in the morning the heads of the various departments wait on him, and make their morning report on their own especial departments. The state of the commissariat and the number of men wounded or sick are also reported on by the senior commissariat and medical officers. He also receives reports on the sanitary state of the civil population, for he must carefully guard against epidemics, which are the worst enemies he has to contend with.

Nor is it only the besieged who have to suffer privations and sickness. In the Crimea the French troops, in particular, were very badly off, whilst the Russians were well fed, and the besiegers were exposed to inclement weather, from which the besieged found cover. The troops of the besiegers are also subject to all sorts of epidemics. Trench-work and new earth-work produce bad fevers, and the ambulances are filled with sick men, and the military doctors have in consequence added Pasteurized milk to their stores.

Provisioning a fortress has been recently somewhat simplified by the introduction of refrigerators. In the last siege of Paris it was necessary to keep the animals alive, and, therefore, to provide large stores of forage and cattle yards for their use; now, however, the cattle are killed, and packed in refrigerating chambers, in which they can be preserved indefinitely at a temperature of 1° below freezing. In the 1889 Exhibition meat was kept thus for 62 days without the fact being capable of detection when it was finally eaten. The air for these refrigerating chambers is carefully dried and purified first, in order to avoid the flavour of the meat being affected, and is then chilled to 35° C. below zero.

The attack and defence proceed very much by rule. Warned by his cavalry or cyclists of the approach of the enemy, the governor of the fortress will usually take up a position some distance in advance. He cannot expect to resist for long superior forces, but to delay the investment for a few days will often be an important matter, and he will doubtless be careful, when retiring slowly upon his fortress, not to run any chance of a serious defeat and loss of men, whom it will be hard, if not impossible, to replace.

He retires on successive positions, therefore, slowly upon his forts, which will probably be more than three miles apart.

The gaps between these forts are closed by emplacements for field, or perhaps heavier guns, and by lines of entrenchments, and to protect these intermediate lines from a sudden assault the governor would allot to each of them one or two batteries of Maxim machine-guns.

The batteries of the forts have now been armed, and the forts and intermediate works garrisoned. The governor takes up his residence inside the enceinte, or perhaps in one of the forts which are threatened, so as to be easily informed of the smallest incidents.

The besiegers have now come up to within two or three miles of the forts; they open fire with field artillery, and perhaps some of the lighter siege guns installed behind epaulments of small relief.

At this point the fortress is summoned, and if the governor is not, as the English say, "the right man in the right place"—if he has not the indispensable moral qualities—he may perhaps yield to the desires of a part of the civil population and surrender, as happened at Soissons in 1814, and caused the failure of one of the finest manœuvres that the genius of Napoleon I had devised.

Suppose, however, that he holds out, the field batteries, unless silenced, continue their fire, and destroy the houses of the neighbouring villages and the buildings within the forts; but they are powerless against the casemates built within the ramparts and covered with more than 30 ft. of masonry and earth, or against the batteries of the fortress or the magazines.

As for making a breach in the ramparts, it is not thought of at this stage, as it is a long operation, and requires the employment of a siege park, with all its material.

Nor can this artillery compete with the fortress artillery, protected by blindages and cupolas, or shields of steel; and here we French have been passed by no one, for we were the first to recognise the superiority of certain kinds of steel, whilst the English still obstinately cling to their compound plates. It is true, however, that to each improvement in the defence there is a corresponding improvement in the attack, and shells of cast, forged, and chrome steel have been the reply of the artillery to the shields of the engineers.

The Regular Attack.—The head of the besieging army now concludes that surprise and intimidation are not sufficient, and that it is necessary to undertake the slow and difficult process of a regular siege. This is no light affair, and it will need all the genius of the chief, all the zeal of his staff, and all the enthusiasm of all his subordinates to overcome the obstacles which nature herself and the enemy offer at every step.

On wet ground swept by projectiles, the soldiers work at digging ditches and raising parapets. Should it rain for a whole night, our soldiers, with their bad boots, move about miserably in the mud. And, to digress, this is a serious question; our officials stand out against all innovation, and the boots remain bad; but who can reason with the exponents of red tape?

Now we commence the besieging batteries, and against the forts of Vaujours and Chelles the besieging General has placed more than 160 guns of all calibres.

The ground has already been reconnoitred by cavalry, and the assailant knows how near he can move without encountering the troops of the besieged.

Artillery positions are now chosen, and this is a very delicate matter, as the besieged, in abandoning some particular hill or plateau, has probably wished to draw the assailant into a position in which defeat can be inflicted upon him. Such a reason has guided us in leaving the gap between Saint-Denis and Vaujours. For the same reason we have not fortified Nancy, for it is flanked by Verdun and Epinal. The walls of China only mislead those who shelter themselves behind them.

The batteries have now to be designed before we can construct them. If it is desired to dismount the defender's guns, a battery suitable for a direct fire with full charges is chosen. To reach the defender behind his parapets, a battery suited to a high-angle fire with reduced charges is necessary.

After nightfall some of the officers and N.C.O.'s silently trace out the batteries on the chosen positions. After this, the working parties, armed with picks and shovels, are extended. Everyone now works in haste, as every movement of pick and shovel means additional security. It is necessary that before daybreak the epaulments should be thick enough to resist the shock of the shells fired by the besieged, and that the guns should be mounted on their platforms. But perhaps the commander of a fort may suspect what is going on, and may throw on the ground the dazzling beam of his electric light. Then, in a quarter of an hour, the heavy guns of the fort will have concentrated their fire on the battery under construction, which, though scarcely commenced, will become a nest of bursting shells. It is a game being played at which the most skilful of the two adversaries is certain to win.

Each side has some advantages; the besieger reckons on his adversary's ignorance of the point of attack, and the darkness of the night, whilst the besieged reckons on his accurate and detailed knowledge of the ground. Still, the unexpected often occurs. At the assault of the Hautes-Perches, in front of Belfort, 200 Germans got into the ditch during the night, but surrendered because they could not find the place at which they had descended. For a four-gun battery the working party is—

20	men	for the revetments,
72	,,	terreplein and ramps,
60	,,	ditch,
18	,,	shell magazine,
16	,,	cartridge magazine,
48	,,	platforms.

with officers and N.C.O.'s in proportion.

Arming the battery still remains, and the difficulty of this, though still great, has

been diminished, thanks to the Decauville narrow-gauge railway, which can be used by the besiegers as well as by the besieged for the transport of either men, or guns, or ammunition, or of supplies of all kinds. With this system it becomes possible to move a piece quickly from one place to another, or to have guns on trucks which can be moved about, open fire from their truck, and, when ranged by the enemy, shift to another place. For the attack of the two selected forts there were laid down nine narrow-gauge lines, all running from the main line. The entrenched camps of Paris, Verdun, Epinal, and Belfort are well provided with railways of this nature, which run up the sides of the hills and connect the enceinte of each place with their outlying detached forts.

Shells containing high explosives, and fired by compressed air, will probably be seen in use in some future sieges. With such projectiles the Germans, in nine shots, recently destroyed the thickest of parapets. The propelling power was contained in 10 to 12 reservoirs, which in turn opened automatically as the shell passed along the barrel of the gun. These high-explosive shells have proved very dangerous when fired from ordinary guns, as the violence of the shock of discharge causes, in nine cases out of ten, the premature explosion of the nitro-glycerine contained in the shell. With the compressed-air guns the shock of discharge is so modified as to prevent this.

Balloons and Pigeons.—How is the governor of the besieged place to maintain a connection with the armies marching to his succour? How is the population of a besieged town to obtain news from without? The cruel experience of 1870 has shown the importance of these questions. Everyone knows the *rôle* played by balloons during the siege of Paris. It is not safe to rely on spies, or on those brave men who risk their lives in attempting to pass through the line of investment. Free balloons are expensive, and it is not possible to foretell in what direction they will travel. Nowadays every important place has many pigeon lofts, in which some hundreds of homing pigeons are kept, and which have been carefully trained in peace-time to the *rôle* they will have to play in war. As regards this matter, the present organization is infinitely superior to that of 1870. In France there are more than 300 homing pigeon societies, all of which have a military organization, some even receiving a subsidy from the Government, and which place at the disposal of the national defence 150,000 pigeons. By this means it has been an easy matter to connect the Eastern fortresses with one another. It is hardly necessary to recall the joy with which the arrival of these pigeons was received during the terrible days of the first siege. In 1870 the first two pigeons were carried from Paris in a balloon on the 25th September, and released at Creil; they returned to Paris the same day. After this, every balloon took with it some pigeons. In this way 302 pigeons were released in the provinces. But as they had been insufficiently trained, and had to contend with the hardships of a rigorous winter, hardly one in five of the total released flew home. Some, also, were shot by the Prussians.

Captive balloons will be of greater value to invested places than to the field armies. From the height of these observatories, which can be moved from place to place at will, an officer can ascertain the positions of the siege batteries, note the movements of the besieger's troops, and can even see the approach of a relieving force. A telegraph wire connects the balloon with the ground, for the purpose of sending messages. Each of the French entrenched camps is provided with a balloon park.

The End of the Siege.—The defence of Paris may be confidently expected to resist all the efforts of the attack. This is no vain hypothesis. With the immense developments of our entrenched camps, with the almost inexhaustible resources offered by our system of recruiting and our mode of mobilization, the situation of a besieging force, before Paris especially, and even before places of less extent and of less importance, such as Verdun, Toul, Epinal, Belfort, Lille, Nice, &c., will not be an enviable one. In the first place, none of these places will have a weak garrison, for at the same moment as the armies are being concentrated along the frontier the active and territorial regiments allotted to the defence of the fortresses will take their places. France can put into the field more than two million equipped and armed soldiers. The supplies would be ready in a very few days. There would not be any waiting until the enemy had approached the place before

bringing in convoys of flour, wheat, forage, cattle, &c. Further, Paris can be provisioned for a month with only the resources of the country enclosed by the new forts. In no case does it appear possible to rigorously invest Paris as in 1870. Take the four extreme points of the outer line of defence—Villeneuve-Saint-Georges, Marly, Domont, and Vaujours, and imagine an army to surround the quadrilateral of which these four forts are the angles. Then the protection of the besieger's lines would require more than two million men[1] and more than 2,000 guns, together with the necessary material. Further, the defending army, by concentrating rapidly on any determined point, with the aid of the railways connecting the forts with one another and with the city, and of the roads and canals, can always succeed in forcing the enemy's lines before the latter would be able to concentrate his forces spread over a perimeter of about 62 miles. Paris, with its extensive line of defence, its industrial resources, its army, and its population, is no longer a simple entrenched camp; it is a small France in the centre of the country.

Thus Paris need not fear in the future having either to suffer a regular siege, famine, or isolation, with its fatal moral consequences.

The committee on explosives has presented its report on the risks of transporting melinite by rail to the War Ministry. The object was to establish whether there was any risk to be anticipated in case of collision or other accident that might occur during transit. To this end, barrels of melinite were subjected to violent shocks, melinite was scattered on the rails, and run over by trucks, &c., and the ultimate conclusion arrived at was that as long as the melinite was kept out of contact with lead surfaces, there was no danger whatever. That, in contact with iron, melinite develops an extremely unstable ferric salt we were aware, but that picrate of lead is unstable is new to us, and we should be very much obliged to any expert who can supply us with further information on this point.

The Ministry of War has just issued the statistics of the Medical Department for the year 1891. The total number of cases of all kinds seen by the doctors was 669,950, or 149 per cent. Of these 41 per cent. were admitted to the infirmary, and 24 per cent. to hospital, a number, in both cases, slightly greater than in the preceding year, influenza again being the chief cause. Judged by admissions to hospital, the corps rank in the following order: Ist 14 per cent., VIth 16, VIIth 18, Vth 19, VIIIth 19·5, IVth 20, XVIIth 20·2, XIth 20·6, XIIIth 20·7, XVIth 20·9, IInd 21·3, Vth 21·7, XIVth 22, XVth 22·1, IXth 24, XVIIIth 25, XIIth 25·4, brigade in Tunis 26, IIIrd 30·8, Government of Paris 33, Division at Oran 38, Algiers 45, Constantine 59.

The new organization of the artillery, which comes into force on the 1st October, enables France to dispose, in the event of war, of 512 field, horse, and mountain batteries in Europe only. Next in order come the Germans with 494 batteries, then Russia with 393, Austria-Hungary with 254, Italy with 207, and last, according to the "Militär-Wochenblatt," Great Britain with 48 only, exclusive, of course, of the batteries in India.

Considerable friction is said by the "Progrès Militaire" to have taken place during the fortress manœuvres at Vaujours between the engineers and artillery, both claiming that the responsibility for the construction of the railways for the supply and armament of the batteries should be entrusted to their charge. For the moment, the difficulty was settled by handing over the full gauge lines to the former, the narrow gauge ones being given to the artillery. Complaint is also made that the construction of the batteries left much to be desired in point of rapidity; 36 and even 48 hours appears excessive for any of the profiles laid down.

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[1] This estimate seems extremely high.

This work is in France an artillery duty. Generally the gunners supplied two-thirds of the labour, the infantry the remainder, an arrangement which does not appear to have given satisfaction.

Germany.—According to a note in the "Militär-Zeitung" (Austrian) the expenses borne by the German one-year Volunteer amount to 80*l.* per annum in the infantry, and from 120*l.* to 160*l.* in the cavalry according to the regiment. It is interesting to compare these figures with the cost of a commission in the British Volunteers.

Russia.—Cavalry manœuvres, in which 13 regiments and 6 horse batteries took part, were held from the 14th to 22nd September in the district of Orany. The work done was principally the drill of attack of large bodies against all arms on the battlefield.

The "Militär-Wochenblatt" calls attention to this as a fresh instance of the increasing importance attached in Russia to the tactical employment of the arm.

The mobilization of the 29th and 33rd Don Cossacks, of the 2nd Kuban, and 10th Orenberg Cossacks, all of them regiments of the 2nd levy, the men being all furloughed in time of peace, is stated to have proved most satisfactory, all of them being assembled within the prescribed period, and soon attaining their full pitch of efficiency.

The "Invalide" discusses Lieutenant-Colonel Neville's paper in the "Indian United Service Journal," and the tactics best adapted to meet it. The Russian paper thinks that Colonel Neville places the efficiency of the Cossacks in drill and horsemanship at far too low a level, and warns us not to confuse the Cossacks with the semi-wild natives we are accustomed to encounter. We can assure the Russian editor that we are under no delusion on this point.

The "Reichswehr" calls attention to further and important reinforcements to the Russian troops in the Warsaw district.

A 19th corps is in process of formation from the 2nd Infantry Division now in the Warsaw command, and a Caucasian division (number not stated), to which a South Russian cavalry division will be added. Two more corps are also intended: the 20th, 21st, and 39th Divisions, still in the Caucasus, giving the nucleus, and a portion of these troops are already on the march.

Spain.—In consequence of recent events in Morocco, the Spanish Army has been increased by some 2,000 men. The peace strength for the present year is fixed at 82,000 men and 16,598 horses and mules, divided as follows: Infantry, 52,310; cavalry, 12,535; artillery, 9,859; engineers, 3,838; auxiliary services, 1,630.

Sweden.—During August last five out of the six divisions of the Swedish Army executed manœuvres. The bulk of the Swedish troops are practically Militia, whose service must not exceed 90 days in the year, and on the day they marched off for their manœuvres they had been only 60 days under arms. The results achieved under the circumstances, according to the "Revue de l'Etranger," were quite surprising. Cavalry manœuvres also, 26 squadrons and two horse batteries, were held, the result according to the same authority being most satisfactory.

Turkey.—The difficulty Turkey finds in supplying remounts to her army is notorious, the cause is partly the complete collapse of horse breeding within the Empire itself, but chiefly it is her unwillingness and inability to pay the price decent horses will always command. Till about four years ago, Hungary was the chief source of supply, but then an attempt was made to buy up horses in Russia; this proved a failure, the horses thus procured being both undersized and weakly in constitution. General surprise, therefore, says the "Reichswehr," has been

expressed at the appointment of a buying committee to visit Charkow and the country round Odessa. This committee is to acquire the horses, 1,000 in number, required for the new howitzer batteries of the 2nd and 3rd corps, which should be exceptionally powerful draught animals, and the result is not expected to prove successful. Simultaneously a committee has been despatched to Anatolia, which should have better prospects, but again it is feared the Turkish objection to ready-money transactions is likely to prove fatal.

FOREIGN PERIODICALS.

NAVAL.

Austria.—*Mittheilungen aus dem Gebiete des Seewesens.* No. 11.—Pola and Vienna. We regret that up to the time of going to press the above periodical had not been received.

Die Reichswehr.—Vienna. No. 680. "The Japanese Helgoland," a strained parallel between the battle off the Yalu and the fight off Helgoland, 1864. No. 686. "The K. K. Navy and Austrian Industry," *à propos* of the contract for the reconstruction of the "Miramar" being given to the Schichau Company at Elbing, in Danzig.

France.—*Revue Maritime et Coloniale.*—Paris. September, 1894. "The Currents of the Ocean and their Origin." "Graphical Ephemerides giving the Co-ordinates of the Stars, for use in Navigation." "Chronicle of the Port of Lorient from 1803 to 1809" (*continued*). "A Study of the Application of Water-tube Boilers for Sea Work." "The Abandonment of Article 216 of the Code of Commerce and the Law of 19th February, 1889." "The Shipwreck and Adventures of the Crew of a St. Malo Vessel on the Coast of South America in 1706." "Influence of Sea-Power on History," translated from Captain Mahan's work. "Note on the Scintillation of Stars." "Vocabulary of Powders and Explosives," translated from the Italian. "Naval Chronicle, England, Germany, Italy, and United States." "Bibliographical Notices." "The Sea Fisheries."

Le Yacht.—Paris. 6th October, 1894. "The Naval Battle off the Yalu" (E. Weyl). "Electricity, the Servo-Motor." "Yachting Intelligence." "Naval Notes, Home and Foreign." 13th October. "On the Subject of the Battle of Yalu" (E. Weyl). "On the Question of Tonnage for Yachts in England and America." "The Yarrow Aluminium Torpedo-boat, and the Construction of Aluminium Vessels in France." "Yachting Intelligence." "Electricity, its Application on board Ships of War." "Naval Notes, Home and Foreign." 20th October. "Some Consideration on the Sea Fishery Industry." "The Work of the Parliamentary Commission of Enquiry into the Navy" (E. Weyl). "On the Question of Tonnage for Yachts in England and America" (*continued*). "The Torpedoing of the 'Aquidaban,'" with plates showing the damage. "Yachting Intelligence." "Submarine American Torpedo-boat." "Naval Notes, Home and Foreign." 27th October. "The New Battle-ship 'Brennus'" (E. Weyl). "Electricity, its application for working Armoured Turrets." "On the Question of

Tonnage for Yachts in England and America" (*concluded*). "Yachting Intelligence." "The last Racing Season in England." "Naval Notes, Home and Foreign."

La Marine de France.—Paris. 1st October, 1894. "The Head of the Personnel." "National Defence and Defence of the Coasts" (Rear-Admiral Reveillère). "Naval Chronicle."

Le Moniteur de la Flotte.—Paris. 6th October, 1894. "The Guns of our Ships of War" (Marc Landry). "The Battle of the Yalu." "Corean Affairs." "The Extra-Parliamentary Enquiry into the Navy." "Colonial Notes." "Naval Chronicle, Home and Foreign." 13th October. "Security at Sea" (Marc Landry). "Corean Affairs." "Naval Chronicle, Home and Foreign." 20th October. "The Director of the Arsenal" (Marc Landry). "The Parliamentary Enquiry into the Navy." "Official Notices." "Colonial Notes." "Naval Chronicle, Home and Foreign." 27th October. "The Director of the Arsenal" (Marc Landry) (*concluded*). "The Extra-Parliamentary Enquiry into the Navy." "The Naval Estimates." "Colonial Notes." "Naval Notes, Home and Foreign."

L'Avenir Militaire.—9th October. "Stratégie de Demain," appeal for more cruisers and torpedo-boats, instead of battle-ships. 26th October. "Our Naval Construction."

Germany.—*Marine Rundschau.*—Berlin. October, 1894. "The Influence of Gunnery Training upon the course of the Naval War between England and America, 1812–13" (Bachmann, Kapitän-Lieutenant). "What Harbours in East Asia are to be Avoided at certain times of the year as Dangerous to Health; what are the Diseases to be feared, and what dispositions ought to be made as to the movements of Ships on the station?" "The Transport-ship 'Ida.'" "Report of the Commander of the 'Buzzard' of the Operation against the Rebels in Samoa to the Minister of Marine." "Naval Notes, England, France, United States, and Argentine Republic." "Experiments with Pneumatic Dynamite Guns." "Promotions, Appointments, &c." "Reviews of Books."

See also *Jahrbücher fur die Deutsche Armee und Marine.*—No. 278. November, 1894. "The Duties of the German Navy" (von Henk, Vice-Admiral, z.D.).

Italy.—*Rivista Marittima.*—Rome. October, 1894. "Water-tube Boilers" (A. Perroni). "Experiments with Model Screw Propellers, Method of carrying them out and applying the Results" (A. Ruggieri, Engineer, 1st class). "The English Squadron at Livorno in 1652" (Dr. Manfroni). "Oils for Lubrication," illustrated (S. Raineri).

Letters to the Director.—"The Engines of the Torpedo-boat Destroyers 'Hornet' and 'Daring'" (A. Perroni). "Steam Stop-valves with Screwed Packing Glands" (N. Soliani). "International Institute of Engineers and Architects," Circular of Mr. Eliver L. Corthell (N. Soliani). "Subsidies and the Mercantile Steam Navy" (R. Quirrolo, Captain).

Naval Notes and News.—Argentine Republic: "Trials of the Cruiser 'Patria.'" Denmark: "Launch of the 'Heimdal.'" France: "Launch of the 'Bruix' and 'Descartes.'" "Trials of 'Brennus,' 'D'Iberville,' 'Friant,' and 'Fleurus.'" "Notes on 'Surcouf' and 'Hoche.'" "Accident to Torpedo-boat No. 120." Germany: "Trials of the 'Brandenburg.'" "Notes on the Manœuvres." Italy: "Launch of 'Calabria.'" "Notes on 'Re Umberto' and 'Sicilia.'" Holland: "Launch of the 'Piêt Hein.'" Russia: "Trials of the 'Sestroriezk.'" "Launch of the 'Admiral Senjavin.'" Spain: "Trials of the 'Vizcaya.'" England and United States: "Naval Notes on Ships in Progress." Turkey: "Notes on the 'Sed-el-bahr,' 'Zohaff,' 'Seyd-i-deria,' 'Scefket Numa,' 'Ahter,' 'Rehber,' &c." "Commercial Movements in Italy in 1893." "On Aluminium." "The German Mercantile Marine," &c., &c. "Notices of Books," &c.

Supplement.—"The French Methods of Oyster Culture," illustrated (Bashford Dean).

Russia.—*Morskoi-Sbornik.*—St. Petersburg. July, 1894. "Regulations for the Imperial Russian Society for Saving Life on the Water." "Witjas and the Pacific Ocean." "The Latest Armour-plate Trials." "Electrical Installations on board Ship for Gunnery Purposes." "Some Peculiarities in the Construction of Ships' Engines in England." "The Appointment of Officers to Ships in the Russian and Foreign Navies." August, 1894. "Regulations for Harbour Police in the Military Harbours of the Empire." "New Organization of the Imperial Forces." "Regulations for the Admittance of Candidates into the Naval Cadet Corps." "Questions in regard to passages of Ships in Relation to Meteorology."

Spain.—*Revista General de Marina.*—Madrid. October, 1894. "Battle-ships" (Captain P. Montojo). "On High Initial Velocities." "The English Naval Manœuvres of 1894." "Zoological Studies by Officers of the Navy." "Considerations which ought to govern Naval Construction." "Commercial Value of the Riff Country." "Vocabulary of Modern Powders and Explosives." "Naval Foreign Notes." "On the Use of Steel for Guns" (*continued*).

United States.—*The United Service.*—Philadelphia. October, 1894. "A Personal Narrative of the Wreck of the 'Vandalia,' at Samoa, on March 16th, 1889." "A Study of Military Desertion." "Origin and Developments of Steam Navigation" (the late Rear-Admiral Preeble, U.S.N.) (*continued*). "The Army and the Militia." "Among our Contemporaries." "Naval and Military Notes." "Service Salad."

MILITARY.

Austria-Hungary.—*Die Reichswehr.*—No. 680. "The Manœuvres at Landskron." "The Japanese 'Helgoland,'" a strained parallel between the battle off the Yalu and the fight off Heligoland, 1864. No. 681. "The German Manœuvres," read. No. 682. "The Manœuvres between the Danube and Eipel," introductory study of the district, carefully arranged. "The Fight off the Yalu." No. 683. "The Manœuvres between the Danube and Eipel." "Letters from Constantinople" (Hassan Ahmed), always good. No. 684. "The Services in Parliament." "The Manœuvres between the Danube and Eipel." No. 685. "Casino and General Staff," discussion of proposed Army Club, in St. Petersburgh, on the lines of the French Cercle Militaire. No. 686. "The K.K. Navy and Austrian Industry," *à propos* of the contract for the reconstruction of the "Miramar" being given to the Schichau Company, in Danzig. No. 687. "The Russian Western Army and its Leaders." No. 688. "Consecration of Colours in Berlin." "The Armament of the Landsturm." No. 690. "The Engineers and the Military Works." "Letters from Constantinople." No. 691. "The Campaign of 1859," review of a book entitled "The War in 1859, from Official Documents, unofficially criticised," very scathing. "Letters from Constantinople."

Mittheilungen über Gegenstände des Artillerie- und Genie-Wesens.—No. 10. "Breech-pieces of Quick-firers," with plates. "Illumination with Carburetted Gases." "Experiments with 6-pr. Q.F. Guns" at Sandy Hook. "Electrical Range-finders."

Germany.—*Militär-Wochenblatt.*—No. 84. "Equitation, and the Training of Young Horses," favourable review of Major von Zansen's translation of James Fillis's "Principes de Dressage, &c." No. 85. "Review of the last issued pamphlet from the K.K. Archives," by Lettow Vorbeck. "Notes from the Camp at Krasnoe Selo," principally cavalry *versus* infantry attacks. "From Africa," short note of an expedition near Walfisch Bay. No. 86. "Essays by Major Wissmann," on self preparation and equipment for African exploration; nothing new. "The Drill of the Prussian Infantry, 1714," interesting. "The American Cavalry," review of book by Captain Wagner, U.S.A., Instructor at Fort Leavenworth. "The French 'Légion Étrangère.'" "The Infantry and Cavalry Schools

in Portugal." No. 87. "Attack of Regular Troops against African Tribes" (von Wissmann), interesting. "Military Espionage," about Lieut.-Col. Klembowsky's book. "French Ideas as to the Employment of Turcos in Coming Wars," worth reading. No. 88. "Pro Gloria et Patria," on the consecration of the new colours. "The Attack on an African Position" (von Wissmann). "The Organization of Voluntary Aid to the Sick and Wounded in Germany." "The New French Infantry Regulations," summary of views expressed in "L'Avenir Militaire." No. 89. "The New Colours." "The Results of the French Recruiting in 1893." "The Cossack Lava." No. 90. "Camping and Marching in Africa: Engagements with Witboy's Followers" (von Wissmann). "The New Organization of the French Artillery." No. 91. "The Manœuvres of 1894," read. "Pursuit, Defence, and Retreat in Africa" (von Wissmann). "The New French Regulations for the Supply of Ammunition in the Field." No. 92. "Pioneer Work in Africa" (von Wissmann), practical. "Scharnhorst's Reforms and Social Democracy," review of Hoenig's book.

Deutsche Heeres Zeitung.—No. 79. "The French Manœuvres," critical summary of the views expressed before the manœuvres by "L'Avenir Militaire," as to limitations imposed by ill-judged economy, is worth reading. "The Défence of the Churchyard of Beaune-la-Rolande" (Hoenig). No. 80. "The Scandal at the Magdeburg N.C.O.'s School," sensible article. "The Action at Ladon and Maizières, 24th Nov., 1870" (Hoenig), interesting, as everything he writes, runs through the whole month's issue. No. 81. "The Russian Navy," summary of article in "La Vie Contemporaine." No. 82. "The French Manœuvres," from the "Spectateur Militaire," 1st August. No. 83. "Infantry Fire," review of General Liebermann's book and articles in "L'Avenir Militaire." No. 84. "German, English, and French Ships in Chinese Waters." No. 85. "Military Espionage," review of Lieut.-Col. Klembowsky's book. No. 86. "Non Soli Cedit," on the Emperor's speech on the occasion of the consecration of the new colours. No. 87. "On the Frontier," from "L'Avenir Militaire."

Jahrbücher für die Deutsche Armee und Marine.—November. "The Prussian 'Leonidas,'" in memory of the action at Selmitz, 19th November, 1744, by Lieut.-Colonel von Schnackenburg; the "Leonidas" was Colonel von Wedel, who, with a Prussian grenadier battalion, held the passage over the Elbe for three hours against overwhelming Austrian forces, thereby saving the army from a catastrophe. "The Duties of the German Navy," by Vice-Admiral von Henk; worth reading. "The Russian Cavalry in the Balkans, 1877–78;" highly laudatory on insufficient evidence. "The Drill Books of the Republic and First Empire" (*concluded*); very interesting. "Austrian Ideas on Permanent Fortifications." Review of von Leithner's book by Lieut-Colonel Frobenius. "The Italian Army and Navy in the first half of 1894." "About Cavalry Regimental Histories," summary of the conditions they should fulfil.

France.—*L'Avenir Militaire.*—2nd October. "Paper Effectives," calls attention to the discrepancies between budget strength and real strength in the army. "Article 5 of the Law on Recruiting," *à propos* of recent death sentences in the army in peace-time. "Regimental Telephones," sums up against their use. "One Year Soldiers," growing evil of the system; this year 89,000 men will go to the reserve with only 10 months' service. "La France à Cheik-Said," reprint from the "Politique Coloniale," calling on the country to assert its rights over the peninsula of Cheik-Said, and to answer our works on Perim with more powerful batteries on the mainland. 5th October. "The Soldier's Bread Ration," protest against the efforts of certain "sociétés cosmopolite" to obtain control of the bread and biscuit contracts; very sensible article. "The Army Manœuvres," searching and very excellent criticisms; should be read. "Re-engagement of Soldiers," reply of objections urged against the proposals of M. de Montfort, in the Chambers. 9th October. "Stratégie de Demain," appeal for more cruisers and torpedo-boats, no battle-ships. "Germans and French," accentuates growing numerical preponderance and increased rapidity of mobilisation of the former.

"More Butchers of Abbéville," exposing frauds on the soldier by the meat contractors. "The Army Manœuvres," read. "Our Naval Force in the East." 12th October. "French Army Effectives," rubs in the difference between budget and real effectives. "German Army Effectives," shows the converse. "On the Frontier," in face of the growing numbers by which France is menaced, even from the peninsula of the Contentin, more thorough individual education of the French soldier is desirable. 16th October. "Article 5 of the Law of Recruiting." "Our Effectives." 19th October. "The War Budget of 1895." "Discipline on the March." "Military Prisons." 23rd October. "The War Budget of 1895." "The Visibility of Colours," read. "Employment Reserved for N.C.O.'s," grievances. 26th October. "Marshal Bosquet," review of recently published life; favourable. "Naval Constructions." 30th October. "The 8th of November," what will be the War Minister's decision as regards sending down men to the reserve. In view of the British Prime Minister's threats and allusions to Agincourt at Sheffield, the "Avenir" implores the Government not to denude the army at such a critical moment. "Incorporation of the New Contingent." "Inauguration of the Statue to Marshal Bosquet, at Pau." The whole month's issue is far above the average in interest.

Le Spectateur Militaire.—15th October. "A Few Words on the Old Soldier," a sensible article by Noel Desmayons, against re-engagements, with which the "Avenir" does not agree. See issue of 5th October. "The New Infantry Regulations," by L. Brun. 1st November. "Journal of the Siege of Jaffa." "More about Old Soldiers," by Noel Desmaysons; a very sensible contribution to the question of the re-engagement of old soldiers; conclusion strongly against the idea. "The New Infantry Regulations," by L. Brun.

Journal des Sciences Militaires.—October. "On the Teaching of Strategy," anti-Clausewitz in tendency, and no originality. "Dernier Effort," by General Phillebert. "*Reflections on the Present Tactics of Cavalry*," summary; worth attentive perusal. "General Principles of Plans of Campaign." "The Campaign of 1814" (*continued*), by Commandant Weil. "The New Regulations for Outpost Duties and Reconnaissance in the Field." "The Resources of Horses of the Different States of Europe." "The War in Mexico" (*continued*).

Revue du Génie Militaire. No. 3. "Attack and Defence of Barrier Forts," with three plates; worth reading. "Graphic Solution of Strains produced by Rolling Loads;" *worth study.* "*Experiments to Determine the Rise of Temperature in Concrete whilst setting.*" "Note on the Design of Concrete Bomb-proofs." "On the Risks incurred in Transporting Melinite by rail;" conclusion is that with *reasonable precaution danger is nil.* "Explosion of a monster Dynamite Charge," 12,000 lbs. in rock-volume moved 30·000 cubic mètres.

Revue Militaire de l'Etranger.—October. "Korea, and the Origin of the Chino-Japanese War." "Organization of the Military Forces of the Ottoman Empire." Notes—"Cyclists in the Austrian Manœuvres." "*Spanish Effectives in 1894-95.*" "Manœuvres at Krasnoe-Selo," &c.

Revue du Cavalerie.—October. "*The Divisional Squadron on Mobilization.*" "Practical Hints on the Training of the Soldier," with special reference to the cavalryman. "Remounts for the Grand Army;" very interesting. "The Horse," *by a "Trainer."* "*Marches of the French Cavalry in Turkey, 1854-55.*" "The Paces of the Horse," application of instantaneous photography to their study. "The 45th Dragoons."

Revue du Cercle Militaire.—No. 40. "The Naval Action off the Yalu." "The War against the Sahara Tribes—*the Battle of Sehoutelma.*" "*The New Disciplinary Regulations in the Portuguese Army.*" No. 41. "Telemeters," evidently not written by a practical gunner. "Smokeless Powders," read. "The Infantry Combat," *comparison of German and French regulations worth reading.* "The

Naval Action off the Yalu." No. 42. "The Expedition to Lombok." "The Staff College at Berlin." No. 43. "Supply of Reserve Officers in Italy." "The Staff College at Berlin." "Telemeters" (*concluded*). Notes, &c.

Revue d'Artillerie.—October. "The Material of the German Siege and Fortress Artillery," by Captain Michaut; very interesting. The bursters of high explosive shells is guncotton; more recently a secret preparation, generally believed to be "picric acid," *i.e.*, melinite, has been adopted. "A New Apparatus for Training Gun Layers and Familiarizing Men with the Regulations for Fire Discipline in the Field Artillery," Captain Froissart. "Summary of the Rifles in Use in the Principal European Armies," by Captain Lauth. "The Pitch of the Screw Threads in Breech Actions," by P. Laurent, of the "Société des Forges et Chantiers de la Méditerranée." Notes, &c.

United States.—*Journal of the United States Artillery.*—October. "Some Tests of the Magnetic Qualities of Gun Steel," by Lieut. Squier. "Practical Suggestions concerning the Armament for Sea Coast Fortifications," Lieut. Whistler. "The Pack Mule and Mountain Artillery," by Captain Schenck. "Range Table for the 5-inch B.L.," by Colonel Pennington. "The Artillery of the U.S. National Guard," Colonel Brush. "Coast Artillery Fire Instruction," three articles by Lieut. Weaver, Captain Tiernon, Lieut. Parkhurst. "The Artillery of the Future," from the French of M. Fauconneau in "Le Génie Civil." "The Best Type of Field Gun for the British Service," reprint of Captain Headlam's paper. Notes—Artillery, "Guns and Carriages," Auxiliary Appliances, "Range-finders," Telescopic, Aide-Tireur, Paschwitz, Crampton Smith, Prismatic, Souchier. The notes throughout are of exceptional interest.

Journal of the Military Service Institution.—"A Paper on Military Libraries," Colonel Clossen. "The New Small Calibre Rifle," Lieutenant Stiles; conclusion is, that though the bullet possesses stopping power enough for all practicable purposes, wounds will heal better and fewer men be permanently disabled. "The Multiplication of Calibres," Captain Leary. "Book-keeping for Post Exchanges." "Non-existence of Martial Law Proper." "The Military Service of Indians." "The Proposed Deep Water Way from the Great Lakes to the Ocean," Lieutenant Simpson; worth reading. "The Mexican Army," Captain Hardie; comment and criticism. "The National Guard." "The Care of the Wounded in War." Reprints. "The West Indies and the Nicaragua Canal." "Turrets in the Forts on the Meuse" (Belgium). Notes. "A New Carbine Carry." "German Artillery Projectiles." Historical Sketches. "The Third Regiment of Cavalry." "The First Regiment of Artillery." "The Seventeenth Regiment of Infantry." "The Twenty-fourth Regiment of Infantry."

NOTICES OF BOOKS.

La Science du Point d'Honneur. Commentaire raisonné sur l'offense—le duel, ses usages et sa législation en Europe, la responsabilité civile, pénale, religieuse des adversaires et des témoins, avec pièces justificatives. Par A. CROABBON, Avocat.

The new treatise on the laws and customs of duelling recently brought out by M. Croabbon, based as it is on the previous works of such famous men as Chateauvillard, Grisier, Prévost and Jollivet, Saint Thomas, and many others, is remarkable for its lucidity and its completeness. The bulk of it is naturally devoted to affairs of honour as they are conducted in France, but the laws regarding them in operation in other countries also are explained with much clearness. The opening chapters discuss the nature and degree of those offences which may call for personal satisfaction, and it should be noted that the *choice of weapons* invariably belongs to the offended party, *i.e.*, to the *challenger*, the person who has given the offence being always regarded as the aggressor; there are three degrees of offence: first, the *simple*, which may be nothing more than a mere discourtesy; second, the *grave*, with which insult is combined; and *third*, the most serious of all, the act of violence, and the offended person acquires rights further than mere choice of arms according to these degrees. The arms considered lawful in France are the sword, the pistol, and the sabre, but the latter may be always refused by a civilian, and the imposition of any other weapon is absolutely prohibited.

Reparation for an injury to a collective body can only be demanded by one of their number: for instance, the officers of a regiment cannot all of them call to account a person who has spoken disparagingly of their corps, but they must agree among themselves as to which one of them is to undertake the affair; and similarly, if a man is insulted by a number of people he has the right to select whichever of them he chooses for purposes of expiation.

The very important duties of the "director of the combat" and of the seconds, both before, during, and after the affair, are minutely described, and a useful form of "procès-verbal" is added for their guidance.

The part of the book likely to be most interesting to English readers is that which deals with the duel with swords, and the perusal of it will be beneficial to all those who concern themselves with fencing competitions, whether as competitors or as judges, while an acquaintance with the entire work may some day be of use to such of our countrymen as either travel or reside abroad; it is as well that these should know further how the laws of their own country would affect them in the case of their having the misfortune to kill an adversary.

A British subject can be tried in this country for murder or manslaughter committed abroad, and wilful killing in a duel is *murder* by English law, and this affects every person concerned in a duel, so that an Englishman, if he becomes involved in an affair of honour, fights always with a rope round his neck; this ought to make him careful to avoid giving offence, and especially to eschew the vulgar habit of practical joking, in which some of our modern cubs are too prone to indulge; merriment of this nature is certain to be resented abroad, and the person who has recourse to it ought at least to count the cost beforehand, and be prepared to put up with the consequences, be they what they may.

Leben und Wirkung des Generals der Infanterie und kommandirenden Generals des Vten Armeekorps, Carl von Grolman. Von E. VON CONRADY, General der Infanterie, z.D. Berlin: Mittler, 1894. Price 8*s*.

General von Grolman entered the ranks of the Prussian Army as "Freikorporal" in 1791, at the early age of 13 years and 9 months, and received his first com-

mission four years later. He was one of the first to see the need of reform in the army, and worked hard under the general superintendence of Scharnhorst to qualify himself for the work the future might have in store for him. It is interesting to note the influence the "Militaerischen Gesellschaft," a society formed on the same lines as our own Institution, exercised on the subsequent evolution of the Prussian Army. It was founded by Scharnhorst in July, 1801, and soon grew to 188 members, amongst whose names will be found almost every one of those which have subsequently become celebrated as the regenerators of the Prussian Army; indeed, had it not been for the work done by this society in disseminating sound principles and knowledge throughout the army, it is more than doubtful whether Prussia would ever have raised her head again, yet with this example before us there are still officers, here in England, who question the value of our own Institution, and ask what good they may expect to get out of it.

During the campaign of Jena he was attached to the staff of the Duke of Brunswick, and received a most striking object lesson in the art of doing things the wrong way and its certain consequences, a lesson which no doubt served to clear his ideas when the future brought with it the necessity of reorganization. In 1807 he was made a member of the Commission appointed under the presidency of Scharnhorst, and with Boyen as coadjutor, to inquire into the conduct of every officer who had either surrendered in the open field or capitulated in a fortress. As under these two categories nine-tenths of the whole army were included, some idea of the responsibility thrown on the Commission may be imagined, and the difficulties of their task were intensified tenfold by the fact that the officers of the Prussian Army of those days were all recruited from the same social class, and related to one another by family alliances in the closest manner possible: whilst the President of the Commission was looked down on as an outsider (he was a Hanoverian, and not "adelig" to boot), and had as many bitter personal enemies, jealous of his successes, as usually fall to the lot of any man of strong character and reforming proclivities.

The Commission tackled its work by decentralisation, every regiment was called on to form a Court of Honour to inquire into the conduct of each of its members, the proceedings were forwarded to the Commission for inspection and ultimate submission to the King, and when, as frequently happened, the exculpatory evidence approved regimentally, was found unsatisfactory, the papers were returned for amendment, and with such searching questions noted on the margin that we must form a very high opinion of Grolman's (on whose shoulders most of the work fell) qualifications as cross-examining council, and his extraordinary capacity for work of the hardest nature. Ultimately the Commission recommended some nine officers of high rank to be shot, and some hundreds to be cashiered, but, fortunately for the culprits, the state of communications, and the demands made on Scharnhorst and Boyen by other and more immediately pressing labour, were so great that the War of Liberation was upon the country before the work was completed, none of the death sentences were executed, and the men threatened with cashiering were for the most part allowed to return to their duties, where they subsequently justified the clemency shown to them. Long before this state of affairs had been reached, Grolman himself incurred the displeasure of Napoleon, and, like the Minister vom Stein, had to send in his resignation. He then went to the Peninsula, where he took service with the Spaniards in the "Legion Extrangera," was present at the battle of Albuera, of which he gives a most unsatisfactory account, and ultimately fell into the hands of the French. Escaping from them, he made his way back to Germany, and remained as a student in Jena until circumstances admitted of his reinstatement in the army in February, 1813. Here the present volume before us leaves him; in the following one we shall hear of him again at Waterloo, and be able to follow his labours in carrying out the reforms inititiated by Scharnhorst.

We have gone into this book at considerable length, because, of all steps ever taken for the regeneration of an army after defeat, this great Commission of Inquiry into the conduct of all officers strikes us as by far the most important in history. To us it appears as the foundation to all subsequent reform, and without it we do not believe that even a fraction of the results since attained in Prussia could ever have been reached. The spirit of an army lies in its corps of officers, and had not the Prussian officers thus demonstrated to the nation at large the fact that they were

ready to submit to the most searching inquiry into their individual conduct, as a body they could never have regained that confidence from the nation which is the indispensable factor in the maintenance of discipline in a universal service army.

Geschichte des Schleswig-Holsteinschen Ulanen Regiments. Nr. 15. Von Glasenap, Premier Lieutenant im Regiment. Berlin: Mittler, 1894. Price 15*s.*

This regiment was raised in October, 1866, and received as its first quarters Perleberg, in the Mark of Brandenburg. The first chapters give some interesting details of the principles on which its training was conducted, which owed their origin to the initiative of Prince Frederic Charles; these details might with advantage have been considerably amplified. In 1870 it formed part of Grueter's brigade in the sixth Cavalry Division, and the part it played in the battle of the 16th August, Vionville, is worth special attention. The Division, after its first contact with the enemy, had been withdrawn into the hollow south of Flavigny; when du Preuil's brigade, the Cuirassiers and the Lancers of the Guard had charged and been driven off by the 52nd Prussian Infantry, it was called on to advance and attack in pursuit. As is well known, they arrived, as a Division, too late, but the Brunswick Hussars and the 15th Uhlans got to close quarters with their enemy, and very nearly succeeded in capturing Bazaine himself. Ultimately, being unsupported by the rest of the Division, which had lost its order and intervals in the advance, the regiment had to retire to its original starting point; though it had been exposed to a furious fire for about half an hour, and though, subsequently, it took part in the final attack ordered by Prince Frederic Charles at the close of the day, its total loss amounted to only 5 men killed and 3 officers, 24 men wounded. Most umpires would have put them all out of action twice over, so great is the difference of shooting in battle to what it is on the range. During the rest of the campaign they had their full share of exposure both to the enemy and the elements, yet their loss for the whole war totals up to 2 officers and 20 men killed, 8 men died of disease, and 6 officers, 28 men wounded, 45 horses dead, and 24 missing only. We mention these figures to prove the point we have often insisted upon, viz., that war risks are systematically overrated by umpires in peace-time. There can be no question as to the gallantry of either men or officers, General von Schmidt's farewell order is sufficient proof that they did even more than their duty; the real truth is that in a regiment properly trained and handled the opportunities for achieving immortality are much fewer than usually imagined.

The Sailor's Pocketbook. Rear-Admiral Bedford. Portsmouth: Griffin and Co. 1894. Price 7*s.* 6*d.*

That a book of this nature should have reached its seventh edition is a sufficient guarantee of its accuracy and capability to supply a wide-felt want, but it seems to us that its popularity might be very materially increased by attention to the conditions it is intended to meet. It is far too bulky; with thinner paper its weight and dimensions might be reduced one half; it is bound in a stiff cover without clasp or protection against weather, and the edges are stained with a red colour, which, when wet, comes off on one's hands. It should be, for convenience, one half the thickness, with a flexible waterproof cover protecting the edges, which might be left plain, or gilt, and some arrangement should be introduced to facilitate keeping it open at the required place in a draughty chart-house or on the deck of a yacht. As regards the contents, little fault is to be found; the sections on the treatment of wounds, accidents, and diseases might be brought up to date, and the old saying that prevention is better than cure might with advantage be borne in mind. It is better to prevent sunstroke than to cure it, and the same is true of a variety of other evils, including fever, cholera, and even drunkenness. Still the book has always been and will remain a favourite with us, and if only the red paint on the edges can be got rid of, it will save our recording angel having to take recourse to his wing feathers.

Die Scharnhorst'sche Heeresreform und die Socialdemocratie. Von FRITZ HOENIG. Berlin: Felix 1894. Price 2*s*.

During the debates in the German Reichstag in 1892 on the new Military Bill, the members for constituencies external to Prussia showed a great ignorance of the principles on which their national arrangements were based, and in the case of the Social Democrats this ignorance became colossal. The primary reason for this state of things deserves notice. It was due to the fact that until after 1866 and 1870 the smaller German States had been organized on the principle of conscription with paid substitutes, a system which in a peace organization gives the worst possible results, as regards both efficiency and the hindrance to national development, conceivable; for the paid substitutes, and more particularly the re-engaged men, being mostly of the lowest class socially, and for the most part being kept in idleness, have nothing else to do but to teach the recruits how to get on the blind side of their officers, and to initiate them into their vices, so that the army actually was in those days what the opponents of the Bill described it, a running sore draining the life-blood of the population.

The Prussians, accustomed to universal service without substitutes, took a very different view of the matter; to them the army was the national university of the nation, in which the instruction was provided by the aristocracy of the country, as officers, and by every intelligent and educated man who served, and who of course are present in the ranks in sufficient number to influence the remainder of lower origin, this being one of the central points of Scharnhorst's great scheme, and his reason for rejecting the paid substitute. The Socialists, however, ignored this side of the question, either wilfully or out of pure stupidity. They knew that Scharnhorst was a name to conjure with, and cried out for what they called the Scharnhorstian plan pure and simple, claiming that the essential feature of his reform was a short service militia only. The object of the pamphlet now before us is to remove this misconception, by historical evidence to the contrary, and Hoenig has fulfilled his purpose in his usual masterly manner. He shows us Scharnhorst as an essentially practical man, caring very little what things were called provided they fulfilled the required purpose, and modifying his views from day to day to meet the exigencies that each fresh Napoleonic demand made on him. It is open to question whether he borrowed his idea of a national militia from England or not, seeing that he was himself a Hanoverian, it is at least not improbable, but the general resemblance of his first proposals in 1807 to our existing organization is too striking to pass over in silence. Briefly, they amounted to these. A standing army forms the mainstay of the whole, service in which is to be for six years, all the remainder of the males in the nation to be subject to ballot, and the men drawn, to serve in the militia, which is not to be called on for purposes beyond the boundaries of their own provinces. As the time was not yet ripe for the drastic measure of making all classes serve together, it was further laid down that all men bringing their own arms and uniforms might serve in special corps, under officers chosen practically as our own Volunteers choose theirs now, they, too, were not to be called on for service beyond their own provinces. But these proposals all failed against the freshly imposed conditions of the French, and then the system of passing men through the ranks as rapidly as possible was had recourse to, but Scharnhorst never imagined that the troops thus turned out could be the equals of the longer service men he originally intended to create.

Then came the retreat from Russia, and then only began the revival of the patriotic spirit of the nation, which alone rendered it possible to make all serve on equal terms shoulder to shoulder in the ranks. But Scharnhorst died before the full consequences of his reform became apparent, and the subsequent steps in Prussian army reform really are signed by von Boyen, though they are generally understood to have been originated by Scharnhorst, as Boyen and he were intimately connected in the same office; and as, to the best of our belief, Boyen never made any claim to have originated the idea on which his orders were based, we may assume Scharnhorst's claim as sufficiently established. The whole book is most interesting, and those who wish to understand the problem of military organization cannot do better than study it.

Beispiele zu Dispositionen für kleinere Felddienstliche Uebungen. With three plans. By Captain FRITZ HOENIG. Berlin: Felix. 1894. Price 1s. 6d.

This little work is intended to meet the difficulty, often experienced by company officers, in framing schemes for company training, not too ambitious in their scope for the numerical strength available. Taking the operations of two whole corps as a basis, he works down to the tasks which in course of such operations may devolve on the smallest patrols and detachments. The work is done with his customary thoroughness, and may safely be recommended to our own officers.

L'État Militaire des Principales Puissances Étrangères au Printemps de 1894. Par J. LAUTH, Capitaine du service d'État-Major. Paris: Berger-Levrault. 1894.

This is a handy little volume, giving full statistical information of the principal armies of Europe, uniforms, mobilization, administration, and organization. The author refrains throughout from comment, and the work is evidently purely the result of compilation; hence, though in the main, and as far as we can check them, the statements are literally correct, yet they sometimes fall very far short of the actual truth. Thus, we can hardly repress a smile in finding under the head of coast fortifications of Great Britain, the Martello Towers from Dungeness to Folkestone, the defences of Yarmouth and Lowestoft, Berwick, and Woolwich, all enumerated in the same category, and without comment, with such powerful works as have been erected at Portsmouth, Sheerness, and elsewhere. For those unacquainted with Woolwich we may add that the statement that it is fortified is literally correct; it rejoices in the possession of an antiquated mortar battery facing the common, a line of weak fieldwork profile defending the Royal Artillery Repository Gardens, and some practice batteries at the Academy and in Plumstead Marshes. As regards internal defences, the following statement is also literally correct, but no more:—"Il n'existe, du reste, pas de fortifications à l'intérieur du pays, si ce n'est quelques châteaux forts et quelques vieilles enceintes à peu près abandonnées aujourd'hui." Still, for those who cannot read von Loebell's "Jahresberichte" in the original, and require more detailed information than we can give in the annual summary of that work published in the Journal, the book may be useful if used with due caution.

The Battle of Custozza: a Tactical Study. By General VERDY DU VERNOIS. Translated by Lieut.-Colonel G. F. R. Henderson, Professor of Military Art and History, the Staff College, and Captain R. A. Henderson. London: Gale and Polden. Price 6*s*.

On the merit of this book it is unnecessary to enlarge, the author's name is sufficient guarantee; but inasmuch as the method he employs is comparatively little understood in England, we give the following explanatory excerpts from the author's and the translator's prefaces, giving the latter precedence:—

"The author's main object is to show how military history may be most profitably studied. But, in working out a phase of the Battle of Custozza as an object lesson, he deals with a variety of tactical incidents; and his method of treating them, as well as his criticisms, are well worth close attention.

"In order that method and criticism may be properly grasped, it is essential that the study of the incidents should be thorough. Military history, if it is to serve any useful purpose, will not stand 'skimming.' The map must be put into constant use, and unless the nature of the ground is realised and distances properly appreciated, the various exercises will have little practical value. The author suggests that whenever a situation is given, a rough tracing of that portion of the map on which the troops are moving should be made, and the disposition of the opposing batteries and battalions accurately marked; and also, that the same course should be followed whenever the student, confronted by one of the series of problems—printed in italics—lays down the book and works out his own solution. This method will not only teach him to estimate time and space at their proper value, and accustom him to deal with the difficulties which they constantly present

in war, but it will oblige him, in the author's words, 'to come to clear and definite decisions, for he has to deal with facts which have all the stubbornness of reality,' thus exercising and strengthening his capacity for judgment, forethought, and resolution."

"A knowledge of general principles is necessary to every one who studies the art of war.

"But the acquirement of this knowledge is not, in my opinion, sufficient theoretical instruction for the officer who may some day have to handle troops before the enemy, or who may be called on to assist the higher commanders.

"I believe that a special preparatory course of instruction is indispensable if we would learn how to lead men in action. This course, when added to a general acquaintance with the art of war, creates a fund of knowledge which will certainly improve the capacity and increase the usefulness of any commander whatsoever.

"The successful application of the art of leading troops depends as much on the individuality of the general and on his influence with the men he commands, as on tactics, strategy, and the working of the staff.

"The studies in troop-leading, which I published in 1870, were principally designed to supply a hiatus in the usual course of theoretical instruction.

"I may say, at the same time, that the Krieg-spiel and tactical exercises over broken ground are other means by which we arrive at the same end; but I recommend the study of military history as exceedingly instructive, and even as absolutely necessary.

"Having treated in my former works of the two first methods, it remains for me, in order to complete my programme, to turn to the study of military history. This study is the object of the following pages.

"All instruction depends on the student and on the books which he can command.

"The lessons which we learn from masters and those which we teach ourselves constitute, so to speak, two different methods of instruction which gradually work in together.

"Complete knowledge of any subject is almost impossible if the student depends altogether on his instructor. But it can be acquired by means of serious application if the course to be followed is clearly understood. It is essential, then, to be familiar with the course to be followed and to know how information is to be extracted.

"Knowledge, it is true, is best acquired from experience. But experience of active service is the lot of few; generally speaking, it must be supplemented by study, and military capacity can only be fully developed by the study of military history.

"This study may be approached in divers ways. In my lectures on military history at the Krieg's Akademie I have always pointed out to my auditors the different methods which may be usefully adopted. These methods, in my opinion, are two in number:—1st, the criticism of facts; and, 2nd, the application of historical facts to tactical problems.

"1st. The criticism of facts.

"Many excellent writers have employed this method, and I may refer, amongst other works, to Kühne's 'Visits to the Battle-fields of 1866.' It is, nevertheless, impossible not to remark that the critics are sometimes injudicious. Very often they have only superficially considered the events of which they write, taking, as it were, a bird's-eye view, troubling little about the respective situations of the two belligerents, and distributing their praise or their blame without discernment.

"The more experience we possess, the more indulgent we are wont to be. Nothing is more false, nothing less like the reality than certain facts as related by certain authors; when we examine into details, we quickly discover how far they are from the truth.

"A thorough comprehension of things military is only acquired by practice and by years of service; the more difficult circumstances are, the more essential are judgment, knowledge, and '*savoir-faire*.'

"Undoubtedly the statements of certain authors are made in good faith, but we should beware of dogmatic assertions, which, resting on no sure ground, lead only to erroneous conclusions.

"The critics very frequently sum up after this fashion: 'The General ought to have done this or that;' or again: 'He ought, under such circumstances, to have said to himself, &c., &c.'

"But a man does not stand on the field of battle with an absolutely undisturbed brain. A tactical *coup d'œil* is acquired by experience and military instinct, but a true knowledge of war is developed only by instruction. I may add that events in the field succeed each other with such rapidity that you can never be certain of fulfilling exactly and without mistakes the mission with which you may be charged.

"I do not put forward these objections in order to destroy faith in so excellent a method of study; my intention is only to put my readers on their guard against principles more dogmatic than sound.

"To my mind, criticism of facts ought to confine itself to the following points:—

"To show war as it is and to fathom cause and effect. Such a study is no tribunal, but a revelation which leads to the proper appreciation of military history and assists us to profit by the experience which it discloses.

"There are, moreover, other methods of criticism. We can form an opinion on the strategy and the tactics of a campaign, or on the administration of the armies. We can work out some question in order to try and arrive at a conclusion agreeable to the true principles of the military art. We can study a single battle or a whole campaign, or we can select several campaigns to serve as groundwork for our researches. For instance, if I intended to form an independent judgment on the employment of cavalry in war, I should take the most celebrated campaigns of Frederick the Great, of the first Napoleon, and of the present era, and frame deductions therefrom as to use of cavalry as a special arm. I should see for myself how the acknowledged masters of war employed their squadrons, what benefit they drew from them, and I should come to a conclusion as to the conditions which cavalry ought to fulfil as regards organization, instruction, and tactics. A study thus conducted would most certainly solve all questions connected with the leading of mounted troops.

"2nd. The application of facts.

"This second method is to my mind preferable; that which consists in making use of military history in order to solve tactical problems.

"When we imagine situations and set ourselves to work out the problems which arise therefrom, it often happens that routine intervenes and renders the whole process useless. Nor is it every one who has the power of inventing difficulties and situations such as war presents. But it is unnecessary to call imagination to our aid, for military history is at hand to supply these situations in abundance.

"The method I advocate is simple enough. It is only necessary to read with attention the history we wish to study, in order to place before ourselves some particular situation applicable to the special object in which we are interested, to examine that situation carefully, and to draw up dispositions adapted to the numbers that were actually available at the time.

"We are here obliged to come to clear and definite decisions, for we are dealing with facts which have all the stubbornness of reality; and the comparison between the dispositions we lay down in the exercise we set ourselves and those actually taken, will lead us to recognise which of the two combinations is the better.

"Here, again, we may attain our end by different methods. If, for example, we are desirous merely of studying the progress of an engagement, we need only take into consideration the incidents of the fight itself.

"But if, on the other hand, we are anxious to train our judgment in the ever varying situations which present themselves in war, we must study history in all its details.

"This method does not exclude criticism of the actual facts, but this criticism must be fair. If it is, we shall find this the best theoretical means of instruction, training us to decision in action, and at the same time increasing our store of knowledge."

The Royal Engineer's Field Service Pocket-book. By Major G. K. Scott-Moncrieff, R.E., A.I.C.E. Chatham: Mackay and Co. 1894. Price 8*s.* net.

We have nothing but praise for this little book, which is handy and compact, and which should attract purchasers from other branches of the service as well as from the one for which it is primarily intended. The principal portion of the book is compiled from the official handbooks for field service; but all drills have been eliminated, as well as the long disquisitions on general principles the average pocket-books have hitherto indulged in. The author has recognised that a pocket-book is only intended to refresh the memory on points of detail, and not a travelling library from which a man can make up for his neglected opportunities of a life-time on the night before a general action. In the work of compilation the writer has been assisted by Captains Gale and Haynes (astronomy and survey), Lieutenant Godfrey Fausett (telegraphy), Lieutenant Leggett (railways), and Surgeon-Major Cotell, A.M.S., and Veterinary Captain Smith have each taken charge of their special department. These names will be sufficient guarantee for the accuracy of the work as a whole. If we have any objection to make it is that more tables for the conversion of foreign measures might with advantage have been added, and the book should have been made of a size to fit the breast pocket of the Service serge.

Essays in Finance. By R. Giffen. London: George Bell and Sons. 1890. Price, 1st series, 10*s.* 6*d.*; 2nd series, 14*s.*

Though money is no longer, as it was in the old days of dynastic armies, the one only factor necessary for the prosecution of war, for money can no longer buy soldiers as it did in the old days, yet the importance of an acquaintance with financial methods and principles is as important as ever to those who would study the great question of military organization.

The chief difficulty in England is and has always been that the financiers have not been soldiers enough, and the soldiers not financiers enough, to understand the bearing of each on the other. To the average financier any expenditure on military organization has always appeared as an unmitigated evil, unavoidable, perhaps, but nevertheless an evil. Soldiers, in Germany at any rate, have long been aware that this is not the case, but that, on the contrary, a sound military organization is not only defensible on insurance principles, but that the money sunk in it is distinctly reproductive, and even to a greater extent than money spent on railways, canals, and the like in India. In their opinion, borne out by experience, the man thoroughly trained in the ranks has not only a prospectively longer lease of life before him, but having been trained by drill to concentrate his whole energy on the performance of the task in hand he does better work for the remainder of his life than he otherwise would do. The gain to the productive power of the nation is therefore the amount due to better work for a longer period less the time lost for two years during the period of his training. Our special reason for referring to this book is that Mr. Giffen, in the first series, gives us an admirable analysis of the actual cost of the Franco-German War, vitiated only by the fact that the point of view mentioned above is entirely ignored in summing up the ultimate net gains and losses on the whole campaign.

According to his figures the total direct and indirect loss entailed by the war on the French was 700 million pounds, and the net gain to Germany, calculated from the same data, was 150 million pounds. Now, in our humble opinion this result is misleading; we should add, on both sides, the capital sunk during previous years in military preparation. As a rough approximation, we may take the average annual outlay on the French army since Waterloo at 15 millions sterling per annum, *i.e.*, up to 1870 a total of 1,850 million pounds. Now, whatever may have been the value of services previously rendered by the army, practically they were all destroyed by the failure of her armed forces to accomplish the purposes which alone justified their existence. Nor does the loss cease there, two other factors have to be remembered; whatever the value of French colonies might have become if the fighting forces had proved successful, the fact remains that up to date the net result of her colonial expenditure is a net loss of revenue which may be safely

capitalised at, say, 10 millions sterling, and to this we must also add the deterioration of the reproductive power, and the capacity for concentrated effort, resulting from the false system of organization and training in force in the old French Army. Neither of these can be estimated with any approach to accuracy, for even the worst system of military service in the world has some redeeming features (*vide* the centurion in the Gospel), and no doubt the existence of the army frequently prevented internal revolution, but even allowing these deductions, the fact must remain that as a consequence of her defeat in battle practically the whole expenditure on the army had been in vain. Against this let us put the consequences of military expenditure in Germany and the return it brought in.

It is impossible to arrive at the sum total of all the expenditure incurred by each of the little States, much of which, too, was wasted, as explained in the review of Hoenig's Scharnhorst printed above, but it is notorious that the army in Germany, and specially in Prussia, was much more economically administered than in France. The closest approximation to which we can arrive is a total of 700 millions sterling sunk in the army from 1815 to 1870, curiously about the same sum as we invested during the same period in railways; but this sum, like our railway investments, was all the time returning money. Each man passed through the ranks not only lived longer and did better actual work, but he became also a better procreative agent, bred healthier and more numerous children.

We cannot, with any approach to accuracy, estimate the value of the two latter factors, but if we assume the average increment of life due to healthier training in youth at only six years—a figure well within the mark—then taking the same estimate of the worth of an average day's labour as Mr. Giffen, it works out to this, that the average return on the 700 millions invested in military training brought in about 4 per cent. per annum, which for the 55 years from 1815 to 1870 give a total of 1,540 millions to be added to the net return given above. The balance, therefore, stands thus: net loss to France due to inefficient army organization, 2,540 millions; net gain to Germany due to efficient army organization, 1,690 millions sterling.

These figures are, of course, but a very rough approximation, but we venture to submit that their general, or, better, relative correctness, is demonstrated by a comparison between the condition of Germany as it was in 1815 and as it is now, and between France as she was then and as she is now, and we believe that there has been no other cause at work during this period capable of accounting for more than one-tenth of the ascertainable and admitted difference.

Still working on Mr. Giffen's lines, we arrive at a lesson which applies to ourselves. The total direct and indirect loss which defeat would entail upon us cannot be put at a lower figure than 2,000 millions; but this is by no means all, for it must be remembered that if we lose command of the sea, we lose India, our carrying trade, and our defeat will involve the colonies in ruin; in other words, not only all private investments to develop the resources of the colonies, but all expenditure made in order to insure the maintenance of the command of the sea will have been made in vain, and may be written off at once as a dead loss; but since 1815 we have spent on an average at least 20 millions a year on our navy and army, including India, or 1,100 millions, a sum which if invested annually at 3 per cent. would have amounted to some 2,500 millions.

In the event of war, therefore, we stand to lose at least 4,500 millions, and the question for us is, what rate of insurance is it worth our while to pay to secure this sum? One and a half per cent. would amply suffice, and does not appear to us exorbitant.

An Unrecorded Chapter of the Indian Mutiny. By R. G. WILBERFORCE, late 52nd Light Infantry. London: John Murray. 1894. Price 8*s*.

This is certainly one of the best short and unpretentious memoirs of the mutiny with which we have yet become acquainted; it contains the whole spirit of the stories and anecdotes we have heard in India from the lips of the men who took part in it, stories which for many reasons have never found their way into print.

The chief interest centres in the description of Nicholson, whom the author

warmly admired, and surely it was a fortunate thing for us that for once we succeeded in getting a man so eminently fitted for such a post in the right place. The absolutely iron resolution of the man and his capacity for subordinating all secondary interests to the main object in view has rarely if ever been equalled, and studying this picture of him as he appeared to a boy of 19, fresh out from England, who could not possibly have been biassed by preconceived impressions which so often at the time prevented older men from doing justice both to him and to others, we can understand what it was about the man that made the natives pay him divine honours; a proceeding which so annoyed him that he issued an order that any man whose openly expressed reverence for him exceeded what was due to his rank and humanity, should be punished with 25 lashes, a punishment which was always enforced. A couple of quotations will give some idea of him to those to whom he may still be a stranger. During the march of the relief column to Delhi, Sir John Lawrence sent a peremptory despatch, concluding with the words: "You are to inform me without delay (1) where you are, (2) what you are doing, (3) send a return of courts-martial held upon insurgent natives, with a list of the various punishments inflicted." Nicholson, who hated letter writing, and was moreover worn out with work, turned down the corner of this document, and wrote (1) name of place where he was, (2) date, (3) *the punishment of mutiny is death*, signed it, and sent it back. When writing to Sir John Lawrence, urging him to send down the 87th, then acting as a guard to the women and children collected at Murree, he closed his letter with the following words: "When an empire is at stake, women and children cease to be of any consideration whatever." The book also affords us an excellent picture of the spirit and discipline which animated the author's regiment, nothing better can be imagined, and we can only trust that if such a trial should again come to us we may at least emulate their example; we cannot hope to surpass it. In the assault on the Cashmere Gate and subsequent street fighting the regiment lost 50 per cent. of its strength.

The Defeat of the Spanish Armada. State Papers printed for the Navy Records Society, and edited by Professor LAUGHTON, M.A., R.N. 1st vol. 1894.

The Navy Records Society was established some 18 months ago "for the purpose of printing rare or unpublished works and MSS. of naval interest, and aims at rendering accessible the sources of our naval history, and at elucidating questions of naval archæology, construction, administration, organization, and social life; it will also deal with the history and growth of our navy from the earliest times, &c., and will illustrate, by original documents, the development of our naval power during the reign of Elizabeth, and the history of the wars during succeeding reigns, &c."

The above is a rough outline of the valuable work the Society has taken in hand, and the volume before us is the first fruits of its labours. The choice of the defeat of the Armada, as the subject matter of the first volume, is also extremely felicitous, for nothing in English history is so familiar in its broad outlines, or appeals so forcibly to our imaginations from our earliest school-days, as the accounts of that great struggle. The late Professor Froude was the first, by his researches, to throw a fresh light on the events of that memorable time, which culminated in the assembling of a large army in Flanders under the command of the Duke of Parma for the invasion of England, followed by the utter defeat, after a series of actions in the Channel between the 20th and the 29th July, 1588, of the great Armada under the command of the Duke of Medina-Sidonia, which was intended to cover the passage of the troops across to the English coast; Mr. Froude's account is now in the main substantiated by Professor Laughton, and the original letters of the principal actors in the great drama, many of which are now printed for the first time. On one special point Froude and Laughton are both agreed, and that is, that the popular superstition which attributes the defeat and dispersal of the Armada not to the action of our own fleet but to a providential heaven-sent storm—*Flavit Deus et dissipati sunt*—must now be dismissed for ever.

In a singularly able and exhaustive introduction to the work which he has edited, Professor Laughton, than whom no greater authority on naval history is to be

found in the present day, recapitulates and summarises, as only a master of his subject can, the real causes which led up to the threatened invasion of England, and he shows beyond doubt that the sending forth of the Armada was "no crusade instigated by the Pope in order to bring heretical England once more into the fold of the true Church," although "religious bitterness was imported into the quarrel," but that "the war had its origin in two perfectly clear and wholly mundane causes:" first, "the exclusive commercial policy adopted and enforced by the Spanish Government in respect of its West Indian and American settlements;" secondly, "the countenance and assistance which had been given by the English to the King of Spain's rebellious subjects in the Low Countries;" other causes of quarrel there were which added fuel to the flame, and among these was the universal belief that "unoffending English subjects visiting Spain on their lawful occasions were, on the most shadowy pretexts, seized by the Inquisition, imprisoned, tortured, and burnt at the stake." Professor Laughton is of opinion that these stories were "much exaggerated and frequently grossly misrepresented," but they undoubtedly had a great effect on public opinion, although what brought matters to a climax was the embargo laid on English shipping in Spain in May, 1585, and the dread of Spain, which could now only be considered as a hostile Power, obtaining the command of the Dutch ports.

Turning now to the actual operations between the two fleets, we are at once struck with the confidence the English naval commanders showed all along in their power to beat the enemy, although in forming this estimate the seamen seem to have stood almost alone. "Of all the panic-stricken accounts," writes Professor Laughton, "of the great Armada which have come down to us not one was written by a seaman or by anyone who had practical knowledge of the Spaniards by sea." "Twelve of Her Majesty's ships," writes Fenner, who was with Drake when he burnt the shipping at Cadiz, "were a match for all the galleys in the King of Spain's dominions." Howard, writing to Burghley, is loud in his praise of his fleet: "I protest before God, and as my soul shall answer for it, that I think there were never in any place in the world worthier ships than these are, for so many. And as few as we are, if the King of Spain's forces be not hundreds, we will make good sport with them." Sir William Wynter writes: "Our ships show themselves like gallants here. I assure you it will do a man's heart good to behold them; and would to God the Prince of Parma were upon the seas with all his forces, and we in the view of them; then I doubt not but that you should hear that we have made his enterprize very unpleasant to him." We could make other quotations to the same effect, but the above are sufficient to show that Elizabeth's seamen at least had no fear as to the result of a battle between the two fleets.

With regard to the composition of the two fleets, it has generally been supposed that the English ships were small, fitted out on the spur of the moment, inefficient, and badly armed as compared with the Spaniards; but the contrary appears to have been the case. "In point of tonnage the best of the English and Spanish ships seem to have been about the same, but there is no doubt the Spanish ships looked larger. Their poops and forecastles, rising tier above tier to a great height, towered far above the lower-built English. Not that the large English ships were by any means flush-decked; but they were not so high charged as the Spanish. The difference offered a great advantage to the Spaniards in hand-to-hand fighting; it told terribly against them when their enemy refused to close; it made their ships leewardly and unmanageable in even a moderate breeze, and, added to the Spanish neglect of recent improvements in rig—notably the introduction of the bowline—rendered them very inferior to the English in the open sea."

The Spanish seamen, moreover, were very inferior to the English; they were to a great extent fair-weather sailors, and even if the men had been equal in quality the Spanish ships were terribly under-manned. The seamen habitually gave place to the soldiers, who commanded, while the seamen did the drudgery. The absolute numbers speak for themselves, and one comparison will be sufficient. The "San Martin," of 1,000 tons, the flagship of the Duke of Medina-Sidonia, had 177 seamen and 300 soldiers. The "Ark" of 800 tons, the flagship of Lord Howard, had 300 seamen and 125 soldiers. So also in regard to guns, both in the number

and weight the English had a great comparative advantage, and they were immensely superior in the working of them; in short, in spite of some disparity in force (the actual numbers engaged during the nine days' fighting being probably 49 English against 62 Spanish) the victory was due to the fact that our ships were handier, better handled, better manned, better armed, and better fought than the Spanish. Professor Laughton, quoting from the work of Captain Duro, a distinguished Spanish naval officer, tells us that the Spanish Fleet which sailed from the Tagus numbered 130 ships (57,868 tons), with 2,431 guns and 30,493 men; but whether more than 120 ships entered the Channel is doubtful, of which about half would be victuallers and transports, so that it is questionable whether they had more than 10,000 or 12,000 fighting men. In the same way our 197 ships and 17,000 or 18,000 men must be reduced by more than one-half by reason of their non-combatant elements.

There is yet one other point to which we must make a reference: it seems quite clear that the English Commanders were far better strategists than either the Queen or any member of her Government, and they all realised that the right place to defeat the Spaniards was in Spanish waters; both Drake and Howard repeatedly urged upon the Queen and the Government that the best policy was to repeat Drake's exploit of the previous year at Cadiz, when he "Singed the King of Spain's beard," as he expressed it, and begged that the fleet might be allowed to seek the Spaniards in their own waters, but Elizabeth resolutely refused, and it is quite clear that she never recognised that the safety of the kingdom depended solely upon the power of the fleet to keep the Spaniards in check, with the result that the country was brought within measurable distance of an overwhelming disaster. It was the command of the sea which saved the country then, as it is only the command of the sea, now, which can assure this country security and peace.

In conclusion we can only most strongly recommend this work to the study of all interested in the naval history of the country, and we hope that the valuable results, which are likely to accrue from the labours of the Navy Records Society, will meet with the due meed of appreciation which they deserve.

Cromwell. By FRITZ HOENIG. 3 vols. Berlin: Luckhardt. 1887.

That no man is a prophet in his own country is an old saying, and we have rarely found it more strikingly illustrated than in the work now before us. In English history Cromwell is either a scoundrel or a saint, according to the point of view of the writer, neither side ever shows him to us as a soldier. The reason is not far to seek; a man can only put into his picture, whether he paints with words or with colours, what he has in him to understand, and the historians, being mostly only civilians, brought up in the traditions of the past two centuries, could only describe him within the limited range of their own intellectual perceptions.

According to the views then current, a soldier was only a machine clothed in red, whose purpose it was to kill; that he was also a human being never entered their heads; he did what he was told mechanically, and without sense of humanity or responsibility; the courage requisite to the fulfilment of his orders was either ignored altogether, or, at best, taken as a very small matter indeed, a commodity, in fact, of which any amount was to be had for a shilling a day, as Mr. John Bright put it. To this class of writer true courage is only shown in speechifying, or writing pamphlets, to the free and enlightened electorate who may occasionally make things unpleasant to the orator by the employment of rotten eggs in controversy or, if the spoken or written matter is offensive to the ruling majority, by locking the offender up in prison. Now Hoenig is a soldier, and one whose nerve has been tried in a very fierce flame indeed; he knows and can explain in words what the demands on a soldier in action really are; the consequence is that he has painted for us a picture of the soldier Cromwell as he really was, head and shoulders above anything we have previously seen.

A few words of explanation may make the matter clearer. Political and diplomatic negotiations are in the nature of arbitration courts, from which all party feeling and passion are supposed to be removed on the difficulties even these

discussions involve we need not enlarge, the exaggerated respect we pay to our successful statesmen is sufficient proof of the fact. But in a state of war the judicial frame of mind almost disappears, the most intense of all human passions are let loose, and the task of controlling them and directing all the energies of the nation to a common purpose is rendered enormously more difficult. This is true of the statesman seated comfortably in the security of his own office, but the demand made on his courage and resolution is as nothing to that made on the man who is compelled to retain his coolness and intellect unclouded when he himself has to share the dangers and excitement of the men he controls.

It is one of the commonest fallacies of the civilian historian to imagine that soldiers are rendered by their training indifferent to the spectacle of human suffering; all military history shows the reverse to be the case. The greater the leader the more intense his sympathy with the men, and the greater the credit he deserves for a resolution made and carried through under the immediate impression of the suffering his resolution entails. For the sake of argument, we are willing to admit that this sympathy with humanity has been, and probably will prove again, to be entirely absent from the Asiatic type of commander, Genghis Khan, Timour, &c., for example; but in civilised warfare we know that Wellington, Moltke, Lee, even Napoleon himself, were all susceptible to it to a greater or less degree. All this Hoenig sees clearly, and the consequence is that whereas former studies of Cromwell are like Chinese drawings, without any sense of proportion or perspective, he has given us a finished study in which perhaps the details of the dress may not be indicated with the same painstaking accuracy, but the whole man is revealed to us in a manner as much more perfect as a portrait by Vandyke is to a Chinese playbill. This may seem exaggerated praise; we can only invite the reader to read for himself and see.

Hoenig's view of historical work is essentially the same as that of the late Mr. J. A. Froude, and no doubt lies open to the same objections. On the other hand, it is open to discussion whether dealing with events so long since past any other method is worth the trouble. Consider merely the difficulty of establishing the actual truth of the simplest occurrence which happened, say, only yesterday. What chance is there then of arriving at the absolute facts of events two centuries old? Is not all done that can be done, when the portrait of a great man, the outlines of a great epoch, have been sketched in, in a form that can be grasped and appreciated by the existing generation? and in this he has been singularly successful.

In his pages we trace the gradual evolution of the great leader; though no soldier by profession, we see him entering into the spirit of our caste, and pointing out from the very first, by sheer innate common sense, the only way to organize a force to contend with the loyal gentry of the country.

"The King's men are gentlemen who will go anywhere at the command of honour, ours are only tapsters and blackguards, what chance have they against such men? We must find some means of getting men who will do for religious conviction what these men do for honour." This was the task he set himself, and the spirit in which it was undertaken, and his victories in the field prove with what results.

For his tactical skill Hoenig has the highest respect, and at the same time shows the steps in its evolution, which it is interesting to trace. At the commencement of the Civil War the thirty years' struggle on the Continent was dragging to its close, and hundreds of Scotch and English soldiers of fortune and conviction were out of employment; these had been fighting under the leadership of Gustavus Adolphus, and naturally gravitated to the side whose principles accorded most closely with their own. These men became the tactical instructors of the first levies, and, as regards the cavalry, taught them the charge in line at full gallop. Wallenstein's men more naturally gravitated to the Royalists, following the lead of Prince Rupert, hence from the first two opposite ideas of fighting were opposed to one another. Cromwell was quick to see the advantages of the former method, and though it is reasonably certain from his own words that he did not always succeed in executing his charges at a gallop, yet we are prepared to accept it as proven that he did his utmost to secure that end. As regards his employment of

the arm as a whole, Hoenig shows him to have been fully up to the standard of the most advanced leaders of the present day. On the march, cavalry far to the front scouting with zeal and intelligence, on the battle-field, held together in masses, charging, the bulk of the force in the first line, rallying quickly, and pursuing to the last breath of man and horse.

But this cavalry could do more than merely gallop and charge, though even that is no small matter. When the occasion demanded it they could dismount and fight on foot, defending hedgerows, defiles, and even fortresses, with a courage and success hitherto unequalled by any cavalry in Europe. In those days a brave man was a brave man, whether you met him on foot or in the saddle, and we cannot understand why the same should not hold good now as it did then, as, indeed, it did very recently across the Atlantic, in the Civil War. It is a mistake to suppose that in those campaigns the horsemen were only mounted infantry; as far as their opportunities permitted, they were exactly what their fathers before them, the old Roundhead cavalry, had been, brave men, equally formidable under whatever conditions you met them, because they knew from experience that it was not the weapon, but the man who stood behind it, that really signified.

As an instance of Cromwell's strategical capacity, Hoenig considers his campaign against the Scotch, which terminated in the battle and pursuit of Preston, to rank highest.

Whilst the Scotch advanced in leisurely fashion, about 6 miles a day, into Lancashire, Cromwell united his forces, with those of General Lambert, by forced marches, near Wetherby. His cavalry, quite in accordance with modern practice, lay out some 50 miles to the front, with special orders to see without being seen, and to mask the passes over the Lancashire hills. Learning that the enemy was approaching the line of the Ribble, he moved off on the 13th August to Otley, 19 miles; on the 14th Otley-Skipton, 22 miles; 15th to Gisbourne, 17 miles; and on the 16th to Hodder Bridge, 13 miles; somewhat startling marches, if the nature of the country and the roads as they were then be taken into account. From here he fell on the flank of the Scotch at Preston, and though the weather was most unfavourable for the offensive, he cut them to pieces and pursued them till they absolutely ceased to exist as an organized body. There was no panic flight, but the Scotch fought with the desperation which has always characterized them, and the losses they inflicted on their pursuers will stand comparison with any butcher's bill of modern times. The Irish campaigns are too long for analysis here, but in them, too, Hoenig sees the proof of transcendant ability, whilst, as an instance of supreme resolution in a most critical situation, he considers that Cromwell at Dunbar remains unsurpassed. This notice has far exceeded the usual limits accorded to any work in this Journal, but Hoenig's work is of such interest to all British soldiers that we offer no apology.

Siberia and the Great Siberian Railway. With Map. London: King and Son. 1893. Price 8*s.*

This is a translation of an official Russian publication, prepared by Mr. John Martin Crawford, U.S. Consul-General to Russia, for the Chicago Exhibition. The work is full of interest, though we hardly expect to see his glowing anticipations of the development of Siberia realised in the immediate future.

Moltke's Lehr- und Wanderjahre, von Dr. MAX JÄHNS, Lieut.-Colonel a. D. Berlin: Hoffmann. 1894. Price 5*s.*

This is an admirable popular work on Moltke's early life up to 1857. The author's name is sufficient guarantee for its accuracy, and those who wish to study the evolution of a great character cannot do better than consult its pages. The chapters summarising Moltke's experiences in Egypt, Syria, and Turkey are especially interesting.

Reflections on the Art of War. By Colonel REGINALD C. HART, V.C., R.E. London: Clowes and Sons. 1894. Price 6s.

This book reaches us too late for complete review. The author states that it is "little more than a compilation of notes for my own instruction," but this need frighten no one, for the compilation seems to have been made with great judgment and care. Colonel Hart's own war experience is sufficient to ensure that no statement untrue to the nature of war will encounter the reader, and we note with satisfaction that he dwells throughout more on the moral nature of the man than on the mechanical perfection of his weapon.